Numerical investigation on the fire resistance of load bearing LSF walls: the effect of the load level

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Abstract. This article investigates the fire performance of Light Steel Frame (LSF) walls commonly used in buildings. Six full-scale LSF tests with different layouts are validated through numerical simulations using uncoupled thermal and mechanical analyses. The hybrid numerical model incorporates experimental data to accurately predict the LSF wall temperature, solving the non-linear transient thermal analysis. Three mechanical simulations are developed: elastic buckling analysis for instability mode, Geometric and Material Non-Linear Imperfection Analysis (GMNIA) for load-bearing capacity at room temperature, and thermo-mechanical analysis considering temperature effects under constant load. Model validation compares six experimental tests under room temperature and fire conditions. The Root Mean Square Error is used for each comparison. Results show that the fire resistance (R) of LSF walls decreases with the load level. The impact of the cavity insulation is examined, revealing potential improvements in fire resistance for cavity-insulated LSF hollow stud walls compared to non-insulated ones. Notably, hollow section studs generally exhibit higher fire resistance than corresponding lipped section studs when void cavities are used. The investigation proposes a new approach to determine the fire resistance based on the relationship between the critical temperature of steel studs (Hot flange) and load levels. This relationship allows us to predict the fire resistance time through a preliminary thermal analysis of LSF walls.

Keywords: LSF walls, load-bearing walls, fire resistance, numerical simulations.

1 Introduction

In recent times, the steel structural system has witnessed a remarkable resurgence, captivating designers and construction contractors seeking cutting-edge technologies. As an advanced alternative to traditional masonry methods, steel construction has become the new standard, offering enhanced benefits from industrialised construction. Within steel construction, the Light Steel Framing (LSF) system has emerged as a prominent player, heralding lighter and more cost-effective steel structures in residential buildings across North America, the United Kingdom, Australia, Japan, and even gaining popularity in emerging economies. While steel structures are favoured for their strength and durability, they face a significant challenge when exposed to high temperatures during fire events. Under such conditions, steel begins to lose strength and stiffness, leading to high deformations and instabilities, potentially resulting in catastrophic hazards. Consequently, it becomes crucial to ensure the fire safety of LSF structures, focusing on minimizing risks to life and property loss.

Addressing these concerns, this investigation introduces a numerical model, validated against six full-scale experiments, to accurately predict the thermo-mechanical behaviour of LSF walls under varying load levels during fire exposure. By establishing a correlation between the load level and the critical temperature, this study offers valuable insights into LSF behaviour in fire scenarios with a new proposal to design LSF walls.

2 Specimens

Structures made by LSF exhibit a distinct assembly pattern. They consist of a steel framework comprising studs and tracks, enclosed by one or more protective plates. This investigation wants to evaluate different types of

assemblies. For that, six experimental fire tests with a similar layout of 3.0x3.0 meters with an arrangement of six studs were spaced every 600 mm from their centres, using standard gypsum as a protective material. A variation of some parameters was selected, such as steel stud grade, and the shape of studs, with and without cavity insulation, as shown in Figure 1. These specimens were selected to evaluate the influence of these parameters on the fire resistance and verify the accuracy of the numerical solution methods.

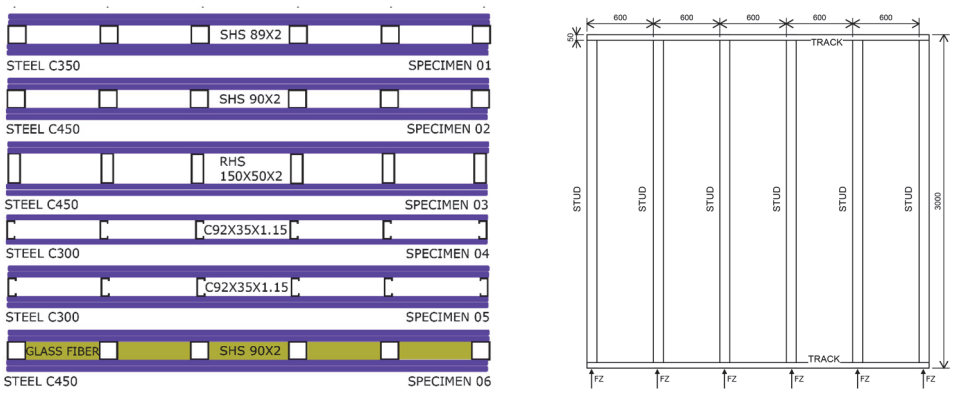

Figure 1. Characteristics of specimens studied.

Specimen 01 is defined in agreement with the experimental investigation developed by Tao et al. [1]. The specimens made of hollow sections 02, 03 and 06 are presented in the work developed by Tao et al. [2], and the specimens 04 and 05, with open shapes, are presented in the work developed by Ariyanayagam and Mahendran [3]. The information on specimens and their results under the fire test is summarised in Table 1.

Table 1. Information on specimens.

ID	STUD SHAPE	STEEL GRADE OF STUDS	NUMBER OF LAYERS	CAVITY	LOAD BEARING [kN]	LOAD LEVEL [%]	FIRE RES. EXP [min]	FIRE RES. NUM [min]
01 [1]	SHS89x2.0	C350	2x16mm	\	187	20	237	↑250
02 [2]	SHS90x2.0	C450	2x16mm	\	193	40	158	141
03 [2]	RHS150x50x2.0	C450	2x16mm	\	182	40	152	↑160
04 [3]	C92x35x1.15	C300	1x16mm	\	40	20	77	↑78
05 [3]	C92x35x1.15	C300	2x16mm	\	40	40	124	↑125
06[2]	SHS90x2.0	C450	2x16mm	Glass fibre	193	40	147	147

3 Mechanical and thermal properties

The thermal conductivity (λ), specific heat (C_p), relative density (ρ) and emissivity (ε) are presented for all the materials involved. Figure 2a presents the thermal properties used for gypsum obtained from the standard prEN1995-1-2 [4]. The thermal properties used for the carbon steel are well established in the EN1993-1-2 [5] (Figure 2b and Figure 2c). The thermal properties used for the glass fibre insulation were obtained from the study developed by Keerthan and Mahendran [6] (Figure 2d). The original density of gypsum consider was 781 kg/m³, 11 kg/m³ to glass fiber, and 7850 kg/m³ to steel. The emissivity was taken as 0.8 for gypsum and 0.7 for steel.

The mechanical properties of four steel grades (C500 used for tracks) followed the Ramberg-Osgood method with a two-stage stress-strain curve scheme developed by Imram et al. [7], using the reduction factors shown in Figure 2d. The properties are determined from the experimental test.

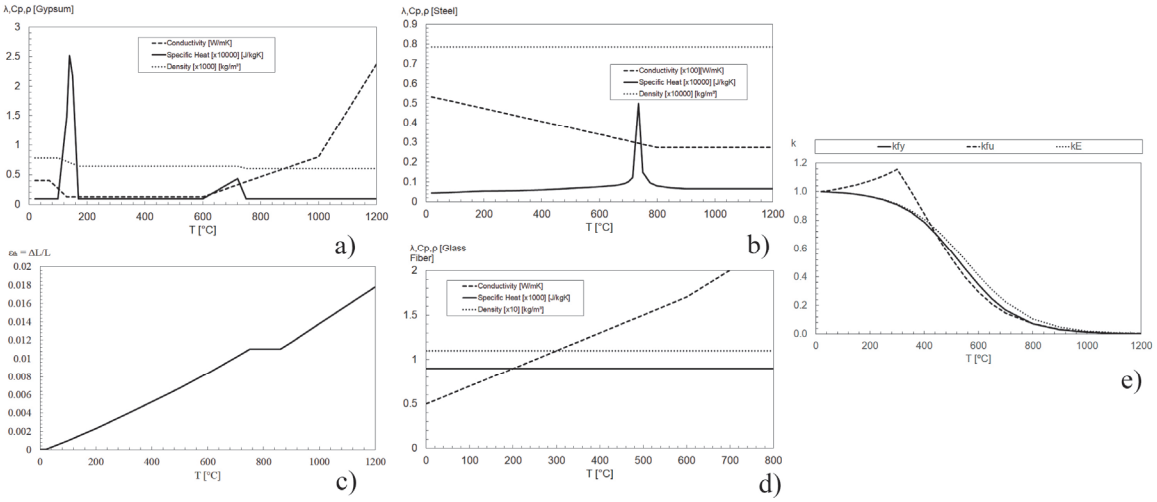

Figure 2. Thermal properties of gypsum (a), steel (b), glass fibre (c), coefficient of thermal expansion of steel (d) and reduction factors to mechanical properties of steel (e).

4 Numerical Validation

4.1 Mechanical model

The finite element "Shell 181" is suitable to model low-thickness elements, and is being used to model the studs and the tracks. The studs were screwed in both extremities (bottom and top) using the tracks made by U-shape, C500 steel grade with 1.95 mm thickness to hollow section stud specimens and 1.15 mm thickness to open section stud specimens. In the physical model, the elements are fixed by screws. To simplify the analysis, joints are modelled by superposition of both steel parts (studs and tracks), using double thickness, sharing the same nodes with in-plane restrain applied to one central node in the horizontal direction (UX=0).

A few additional restrictions were applied to the model. In the top track, the web surface is considered partially restrained, using null displacement in all three directions UX (horizontal), UY (depth), and UZ (vertical) and no rotational restriction. The horizontal restriction (UX=0) is also applied to the screw positions fixing the plasterboard layers to studs. For each stud, the load was distributed by 4 nodes, using the interface beam (web of the track with an extra thickness of 30 mm) to distribute the load over the track and avoid the stress concentration effect. An additional restrain (UY=UX =0) was applied to the central node of the stud, to prevent forces from moving out of the plane.

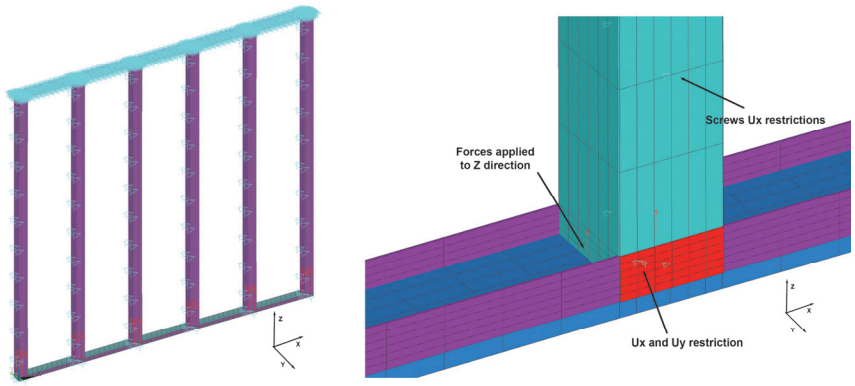

Figure 3. The mechanical model with movement restriction, specimen 01.

An example model and boundary conditions are depicted in Figure 3, where each colour represents a different thickness.

4.2 Imperfections and mechanical model validation at room temperature

The first step is made by a linear elastic buckling analysis at room temperature using the Block Lanczos extraction method to determine the critical load and main instability mode shape of the LSF structure. This instability mode is used to define the imperfection of the structure. A global buckling failure mode was identified for specimens 01, 02 and 06, while a local web buckling failure mode was identified for specimens 03 to 05. The maximum local geometric imperfections in cold-formed steels are given by Schafer and Pekoz [8] and to studs subject to global buckling. A global imperfection with a maximum amplitude of L/1000 has been applied, where L is the buckling length of the stud. With the initial imperfections applied to the geometry, the validation is verified by the load-bearing capacity of specimens at room temperature. The Arc-Length method was used to estimate the load-bearing capacity at room temperature, using the convergence criterion based on displacement with a tolerance of 5% and a reference value of 10^{-3} m. The load increment was defined as 100 [N] with a possible change between 10 and 1000 [N].

Table 2 summarises the results of this section, which may be considered a good agreement between numerical simulations and experimental maximum load. The parametric study is based on a set of load levels, and the load bearing is defined by the numerical results. A maximum difference of approximately 14% was achieved for specimens 02 and 06. However, the authors of the fire tests pointed out the possibility of underestimation in the experimental results, due to some asymmetry in the mounting of the specimens [2].

Table 2. Details of ambient temperature load capacity validation.

ID	MAXIMUM LOAD (EXPERIMENTAL) [KN]	MAXIMUM LOAD (NUMERICAL) [KN]	DIFFERENCE [%]	LOAD BEARING [KN]
01	187	192	2.67	192
02	193	220	13.99	220
03	182	180	-1.10	180
04	40	40	0.00	40
05	40	40	0.00	40
06	193	220	13.99	220

4.3 Thermal model validation

A good thermal model is essential for conducting an accurate and reliable thermomechanical analysis. The hybrid thermal model has been selected based on previous investigations [9]. The same LSF structure models have been defined with additional solid finite elements "Solid 70" to represent the 16 mm external gypsum layers and glass fibre insulation material applied to the cavity. Figure 4a shows the perspective view and a section of the thermal model used for specimen 06. The external layer of gypsum has been removed, see Figure 4b and Figure 4c shows a section view of specimen 06 with the three materials, gypsum (red), glass fibre (dark blue) and steel (light blue). To represent the fire effect on the LSF wall, the convection boundary condition is applied to the fireside surface with a coefficient of 25 W/m²K and bulk temperature evolution with time, following the furnace fire curve from experimental results. The radiation is also applied to the fireside surface with an emissivity equal a 1. In the unexposed surface, only convection is applied, using the coefficient of 9 W/m²K to include the radiation effect, assuming a constant bulk temperature of 20 °C.

This hybrid model also requires the calculation or the definition of the bulk temperature inside the void cavity. For this study, the average temperature measurements between the HF (Hot Flange) and CF (Cold Flange) have been used as bulk temperature, with a convection coefficient of the cavity equal to 17 W/m^{2}K and the flame emissivity equal to 1. For the case of specimen 06 (cavity filled with fibreglass), one decided to apply convection with the same film coefficient (17 W/m^{2}K) and radiation with a reduction in the emissivity to 0.5, inside the hollow section. The thermal validation is verified by the temperature comparison between the numerical and experimental results. The bulk temperature used to simulate convection and radiation on the exposed side was defined by the real furnace curve. Following the standard to fire tests [10] is necessary to apply the standard temperature curve [11], but sometimes the experimental furnace tests present a difference between the furnace curve and ISO 834 curve. A significant difference occurs in specimen 01, where the curves differ by more than 100 °C after 240 min. This difference was explained by the author with a problem in the low-pressure supply of the gas furnace [1].

The thermal solution is transient and nonlinear, using an incremental time step of 60 s, with the possibility to be reduced to 1 s with the time at the end of the simulation equal to the experimental fire test. The convergence

criterion was based on the heat flow, with a tolerance value of 10^{-3} and a reference value of 10^{-6} [W].

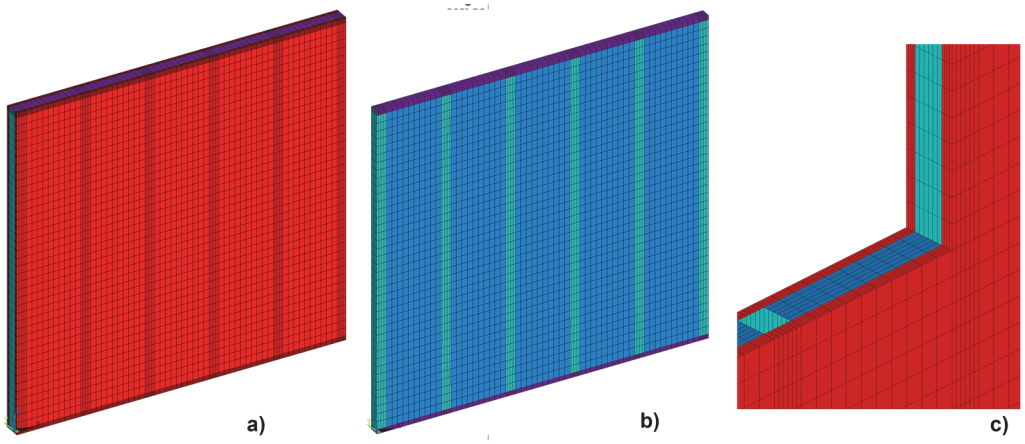

Figure 4. a) External view of the thermal model. b) Omitting gypsum. c) Cut view of specimen 06.

The numerical temperatures are determined by collecting the results over time from nodes closest to the position of the thermocouples, following the same nomenclature. In this paper, to assess the quality of the results, the Root Mean Square Error (RMSE) is applied for the temperature histories of the steel stud, by comparing the finite element analysis and experimental results, every 10 minutes. The results are presented in Table 3, demonstrating an accurate approximation and all specimens. It is worth noting that the recorded temperature by any thermocouple in the furnace shall not deviate from the standard temperature curve by more than 100°C, after the first 10 minutes of any standard fire test, according to EN1363-1 [10].

Table 3. RMSE error for the temperature evolution in all components.

ID	NUMBER OF INSTANTS [N]	RMSE HF [°C]	RMSE CF [°C]	RMSE PB1 [°C]	RMSE PB1-2 [°C]	RMSE PB2 [°C]	RMSE PB3 [°C]	RMSE PB3-4 [°C]	RMSE PB4 [°C]
01	24	75.76	39.99	12.67	102.06	45.04	56.77	25.15	8.75
02	15	47.61	27.93	27.53	124.46	52.14	47.18	13.00	16.08
03	15	36.47	42.70	21.26	109.27	32.97	30.64	9.70	10.52
04	7	20.54	43.59	8.54	-	33.18	32.18	-	23.88
05	12	11.08	19.40	31.77	134.73	39.12	31.03	9.75	10.21
06	15	40.01	57.52	17.37	114.17	111.43	210.62	30.59	24.37

The results of the temperature evolution in PB1-2 show the biggest error and stay above the 100°C of difference by the RMSE. This may have occurred because, in the numerical model, the contact between layers is modelled as perfect, providing a uniform and total heat transfer by conduction. In the fire test, the layers are attached by screws and the position of thermocouples between layers 1 and 2 (PB1-2) can move away from the perfect contact. A similar justification can be drawn to the PB3 temperature of the gypsum plate in contact with the insulation (specimen 06).

4.4 Thermomechanical model validation

To conduct the thermo-mechanical analysis, the model is modified by removing the solid finite elements but their thermal effects are considered from the temperature history. The boundary conditions for displacements remain consistent with those used in the load-bearing simulation, which results in a partially restrained effect within the plane of the wall. With the same load level used in the experimental test, the model undergoes a step-by-step and interactive process for thermo-mechanical analysis. The time step used is initially set to 60 seconds, but it can be decreased to 0.01 seconds if necessary. The Newton-Raphson method is employed, utilizing a convergence criterion based on internal efforts. The force and moment are measured using a reference value of 1 [N] and 1 [Nm] respectively. A tolerance level of 0.1% is considered. All the specimens show a good agreement

regarding the failure mode even if specimens 01, 03, 04, and 05 exhibited non-convergence during the thermal simulation, which coincided with the duration of the experimental tests. Nevertheless, by analyzing the von Mises stress for each specimen, the conclusion can be drawn that a load-bearing failure is expected to be achieved shortly after the respective time, see Table 1.

5 Parametric study

The fire resistance of the models is evaluated by subjecting them to the thermomechanical simulation but with different load levels, ranging from 20% to 80% of the LSF maximum load-bearing capacity at room temperature. with increments of 5%. The same convergence criteria are used for force and moment. The results include time to failure, critical temperature (Hot Flange) and unexposed temperature.

Figure 5a) presents the results obtained from 54 thermomechanical simulations, and Figure 5b) presents a series of 94 experimental and numerical results determined by other researchers ([1]–[3], [9], [12]–[15]), depicting the relationship between the load level and the critical temperature.

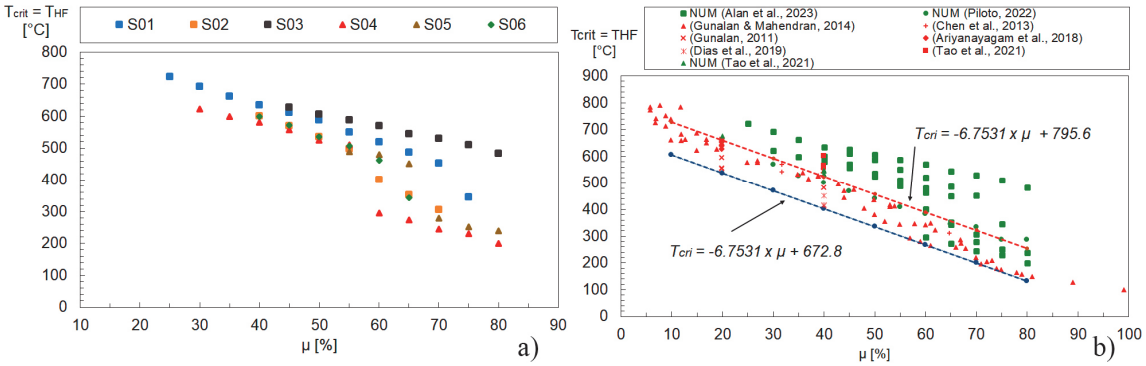

Figure 5. a) Critical temperature of the LSF wall. b) Critical temperature to all LSF structures.

This visual representation allows for a clear understanding of how the critical temperature varies with different load levels. Considering the average value of the HF temperature for each load level, the trendline (red line) and the same trendline minus two times the standard deviation of the numerical results (blue line), a new equation proposal provides a reasonable approximation with a high level of safety (design assisted by testing and simulation). These formulas effectively estimate the critical temperature for all the specimens.

6 Conclusions

The models underwent successful validation of load capacity at room temperature, also exhibited good performance in predicting temperature distribution and the model proved capable of accurately predicting displacements, failure mode and fire resistance (R). Considering the hot flange temperature as the critical temperature for LSF walls, a new equation was proposed to determine the fire resistance based on the results obtained by this investigation and a new compilation of almost a hundred other results from known literature. This proposed relationship enables the prediction of the fire resistance time (R) at a certain load level, through a preliminary thermal analysis of LSF wall types. The results for structures with hollow sections showed a higher critical temperature than those with open sections, which may be a better solution for LSF walls. This is possibly due to the different heat transfer mechanisms of this type of profile. Especially the analysis of the rectangular section which besides showing a higher critical temperature, also showed a lower decrease in FRL with the load level, is probably an excellent stud choice for future applications. Besides the better results regarding the critical temperature, the application of cavity insulation (glass fibre) when using a squared hollow section increased the fire resistance by 5 minutes. This behaviour is not observed in open sections (lipped), which have their fire resistance decreased by the bowing effect. The thickness of the protective layer was studied in specimens 04 and 05, which showed an increase of 4 minutes in fire resistance for each additional 1 mm of gypsum material.

Overall, this investigation provides valuable insights into the fire behaviour of LSF walls with gypsum protection, highlighting the influence of load levels and insulation on their fire performance. The findings contribute to enhancing the design procedure of LSF wall members, promoting improved fire safety standards.

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XLIV CILAMCE PORTO 2023

Certificate of Attendance

This is to certify that

PAULO ALEXANDRE GONÇALVES PILOTO

has attended the CILAMCE 2023 - The XLIV Ibero-Latin American Congress on Computational Methods in Engineering, held in Porto, Portugal from the 13-16 November, 2023.

Renato Natal Jorge
The local Chair

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DAY 1: 13 OF NOVEMBER

*FEUP, **Plenary Sessions** – Room: Auditório*

Start: 16:30

Title: **Experiences in high performance computational mechanics**

Speaker: Guillaume Houzeaux [*Researcher at Barcelona Supercomputing Center, Centro Nacional de Supercomputación (BSC-CNS)*]

Chair: Jorge Belinha

Start: 17:15

Title: **Research in dynamics for railway infrastructure: from computational dynamics to international consensus in codes**

Speaker: Jose M. Goicolea [*School of Civil Engineering, Universidad Politécnica de Madrid. Professor and Head of department for structural mechanics*]

Chair: Diogo Ribeiro

*FEUP, **Session A1** – Room: Auditório – MS09 (Chair: Ney Augusto Dumont)*

Start	*ID*	*Title*	*Authors*
14:45	463	*CONSISTENT, PRECISE AND ACCURATE: THE COLLOCATION BOUNDARY ELEMENT METHOD FOR GENERAL TWO-DIMENSIONAL PROBLEMS*	Ney Augusto Dumont
15:00	722	*1D NONLINEAR ACOUSTIC WAVE EQUATION IN HETEROGENEOUS FLUID*	Renan André Peres, Antônio Manoel Ferreira Frasson, Carlos Friedrich Loeffler, Fábio P. Piccoli, Julio Tomás Aquije Chacaltana
15:15	780	*EXPLORING DEEPONETS TO ACCELERATE NUMERICAL INTEGRATION IN BEM MODELS*	Aline Guillermo, Cassiano Bueno, João Lucas Almeida, Alberto Nogueira Jr, Josue Labaki
15:30	821	*ANALYSIS OF THE CONDITIONING OF THE INERTIA MATRIX IN ACOUSTIC MODELS OF THE BOUNDARY ELEMENT METHOD WITH DIRECT INTERPOLATION*	Carlos Friedrich Loeffler, Gyslane Aparecido Romano
15:45	580	*ENHANCING FLOW MODELLING IN SUBSURFACE RESERVOIRS: EXTENDING AND OPTIMIZING NON-LINEAR FLUX SPLITTING SCHEME FOR 2D AND 3D APPLICATIONS*	Pijus Makauskas, Mayur Pal

*FEUP, **Session A1** – Room: Sala de Atos – MS16 (Chairs: Henrique Kroetz and Carlos Conceição António)*

Start	ID	Title	Authors
14:45	654	*RELIABILITY ANALYSIS OF CORRODED PIPELINES USING AN EFFICIENT SELECTIVE MONTE CARLO APPROACH*	Rodrigo S. Oliveira, Renato S. Motta, Eduardo A. de Souza Neto, Silvana M. B. A. da Silva
15:00	757	*DIMENSIONAL REDUCTION OF PROBABILITY SPACES VIA SOBOL' INDICES APPLIED TO COMPOSITE LAMINATES OPTIMAL DESIGN*	Gonçalo das Neves Carneiro, Carlos Conceição António
15:15	829	*PERFORMANCE COMPARISON BETWEEN MULTIPLE-OUTPUT ARTIFICIAL NEURAL NETWORKS AND CLASSIC SURROGATE MODELS FOR SYSTEM RELIABILITY PROBLEMS*	Henrique Machado Kroetz, Bruno Gustavo dos Santos
15:30	855	*PROBABILISTIC ASSESSMENT OF CEMENT SHEATH INTEGRITY IN OIL AND GAS WELLS*	Thiago Barbosa da Silva, Eduardo Toledo de Lima Junior, Charlton Okama de Souza
15:45	893	*RELIABILITY-BASED DESIGN OPTIMIZATION OF STEEL FRAMES USING GENETIC ALGORITHMS AND ARTIFICIAL NEURAL NETWORKS*	Laís De Bortoli Lecchi, Francisco de Assis das Neves, Eduardo Souza de Cursi, Ricardo Azoubel da Mota Silveira, Walnório Graça Ferreira
16:00	911	*OPTIMAL RISK-BASED DESIGN OF A RC FRAME UNDER DIFFERENT COLUMN LOSS SCENARIOS*	Lucas da Rosa Ribeiro, André Teófilo Beck, Fulvio Parisi

*FEUP, **Session A1** – Room: B032 – MS20 (Chair: Álvaro Coutinho)*

Start	ID	Title	Authors
14:45	546	*VORTEX-INDUCED VIBRATIONS PREDICTIVE MODELING WITH TRANSFORMERS*	Jacques Honigbaum, Rodolfo S. M. Freitas, Souleymane Zio, Gabriel M. Guerra, Fernando A. Rochinha
15:00	618	*ANALYSIS OF ONE-VS-ALL VERSUS ONE-VS-ONE APPROACHES IN LITHOFACIES CLASSIFICATION*	Gallileu Genesis, Igor Fernandes Gomes, José Antonio Barbosa
15:15	761	*MODEL-CONSTRAINED UNCERTAINTY QUANTIFICATION FOR SCIENTIFIC DEEP LEARNING OF INVERSE SOLUTIONS*	Russell Philley, Hai V. Nguyen, Tan Bui-Thanh
15:30	827	*SPECTRAL METHOD AND MACHINE LEARNING APPROACH TO WIND TURBINE DAMAGE DETECTION*	Maciej Dutkiewicz, Marcela R. Machado, Jefferson da Silva Coelho

DAY 2: 14 OF NOVEMBER

*FEUP, **Semi-plenaries Sessions** – Room: Auditório*

Start: 11:30

Title: **Reduced Order Modelling in Computational Fluid Dynamics: state of the art, challenges and perspectives**

Speaker: Gianluigi Rozza [*SISSA mathLab coordinator*]

Chair: Renato Natal

Start: 12:15

Title: **Simulation of the mechanical behavior of laminated composite materials using physical models and artificial intelligence**

Speaker: Pedro Camanho [*Full Professor at the Department of Mechanical Engineering, Faculty of Engineering, University of Porto (FEUP) and Vice-President of the Institute of Science and Innovation in Mechanical and Industrial Engineering (INEGI)*]

Chair: Luísa Sousa

Start: 11:30

Title: **Recent developments on the long-term analysis of shells for application on eolic blades**

Speaker: Paulo de Mattos Pimenta [*Universidade São Paulo*]

Chair: Ricardo Santos

Start: 12:15

Title: **Recent Developments and Applications of the Generalized Finite Element Method for 3-D Fracture Propagation**

Speaker: Carlos Armando Duarte [*Department of Civil and Environmental Engineering University of Illinois at Urbana-Champaign*]

Chair: Jorge Belinha

*FEUP, **Session B1** – Room: Auditório – MS25 (Chairs: Philippe Devloo and José Alves)*

Start	ID	Title	Authors
9:00	549	*FIRSTS STEPS FOR A FULLY EXACT THIN-WALLED ROD MODEL INCORPORATING GENERIC CROSS-SECTIONAL DISTORTION*	Marcos Pires Kassab, Eduardo de Morais Barreto Campello
9:15	573	*A SIMPLE GEOMETRICALLY EXACT FINITE ELEMENT FOR THIN SHELLS*	Matheus Lucci Sanchez, Paulo Mattos Pimenta, Adnan Ibrahimbegovic
9:30	578	*STUDY OF THE INCLUSION OF HETEROGENEITY IN THE DETERMINATION OF CONSTITUTIVE RELATIONS FOR MICROMORPHIC MEDIA THROUGH HOMOGENIZATION*	Pamela Daniela Nogueira Reges, Roque Luiz da Silva Pitangueira, Leandro Lopes da Silva
9:45	592	*NUMERICAL INVESTIGATION OF ORTHOTROPIC FINITE ELASTICITY PROBLEM WITH DISCONTINUOUS DEFORMATION GRADIENT*	Adair Roberto Aguiar, Lucas Almeida Rocha
10:00	596	*A SIMPLE TRIANGULAR MULTILAYER KIRCHHOFF-LOVE SHELL ELEMENT*	Gustavo Canário Gomes, Paulo de Mattos Pimenta, Adnan Ibrahimbegovic
10:15	599	*TOPOLOGICAL DERIVATIVE-BASED MULTI-MATERIAL STRUCTURAL OPTIMIZATION WITH ADAPTIVE MESH REFINEMENT*	Jorge Morvan Marotte Luz Filho, Antonio André Novotny
10:30	605	*ON THE NUMERICAL MODELING OF LASER POWDER BED FUSION ADDITIVE MANUFACTURING OF TI-6AL-4V*	Mohammad Malekan, Ali Ghasemi, Rasid Ahmed Yildiz
10:45	617	*DISSIPATION ANALYSIS ON A LARGE STRAIN THERMO-ELASTO-VISCOPLASTIC MODEL USING THE FINITE ELEMENT METHOD*	Péricles Rafael Pavão Carvalho, Rodolfo André Kuche Sanches

*FEUP, **Session C1** – Room: Sala de Atos – MS25 (Chairs: Philippe Devloo and José Alves)*

Start	ID	Title	Authors
14:30	635	*ANALYTICAL TECHNIQUES FOR CALCULATING THE WORK OF A PLATE*	Stanislava V. Kashtanova, Alexey V. Rzhonsnitskiy
14:45	665	*A TRIANGULAR VIRTUAL ELEMENT FOR THIN SHELLS*	Tiago Park Wu, Paulo de Mattos Pimenta
15:00	768	*LOGARITHMIC STRAIN TENSOR IN THE POSITIONAL FORMULATION OF FEM*	Daniel Boy Vasconcellos, Marcelo Greco

*FEUP, **Session C1** – Room: Sala de Atos – MS19 (Chair: José Maria Campos dos Santos)*

Start	ID	Title	Authors
15:15	568	*IMPROVING THE VIBRATION CONTROL PERFORMANCE OF METAMATERIAL STRUCTURE BY THE INCLUSION OF NONLINEAR LOCAL RESONATORS*	Douglas Roca Santo, Elke Deckers, Paulo José Paupitz Gonçalves, Leopoldo Pisanelli Rodrigues de Oliveira
15:30	716	*LOW-FREQUENCY PASSIVE NOISE CONTROL USING PERIODIC HELMHOLTZ RESONATOR ARRAYS*	Wanderson Vinicius de Oliveira Monteiro, José Maria Campos dos Santos, Edilson Dantas Nóbrega
15:45	814	*STABILITY AND PERFORMANCE ANALYSIS OF ACTIVE TOPOLOGICAL NON-HERMITIAN METASTRUCTURES*	Danilo Braghini, Juan Francisco Camino, José Roberto de França Arruda
16:00	871	*INVESTIGATION OF BAND STRUCTURES FOR DIFFERENT LATTICE TYPES IN SIERPINSKI PHONONIC FRACTAL CRYSTALS WITH LOCAL RESONANCE*	Victor Gustavo Ramos Costa Dos Santos, Edson Jansen Pedrosa de Miranda Junior, José Maria Campos Dos Santos
16:15	874	*COMBINING ACOUSTIC BLACK HOLE AND PHONONIC CRYSTAL TO ATTENUATE STRUCTURAL VIBRATIONS*	Jean Pietro Carvalho dos Santos, Dr. José Maria Campos dos Santos, Lucile Naudat

*FEUP, **Session D1** – Room: Sala de Atos – MS24 (Chairs: Denise Siqueira and Isaac Santos)*

Start	ID	Title	Authors
17:00	774	*NUMERICAL SIMULATION OF GAS LIFT SYSTEMS USING THE VOLUME OF FLUID METHOD*	Naim Jessé dos Santos Carvalho, Livia Flavia Carleti Jatoba, Grazione de Souza, Helio Pedro Amaral Souto
17:15	642	*A POSTERIORI ERROR ESTIMATION FOR LINEAR ELASTICITY WITH WEAK STRESS SYMMETRY*	Denise de Siqueira, Thiago de Oliveira Quinelato, Jeferson Wilian Dossa Fernandes
17:30	775	*FULLY COMPUTABLE A POSTERIORI ERROR ESTIMATES FOR THE PRIMAL HYBRID VARIATIONAL FORMULATION OF POISSON'S EQUATION*	Victor B. Oliari, Paulo Rafael Bösing, Denise de Siqueira, Philippe Devloo
17:45	787	*CFD OPEN-SOURCE CODE VALIDATION FOR FLUID-STRUCTURE INTERACTION IN BUILDING ANALYSIS*	Valerio Silva Almeida, José Emanuel da Silva Montiel, Edson Bispo Ferreira, Fernando Akira Kurokawa
18:00	802	*A LOCALLY-ADAPTIVE TRULY-EXPLICIT TIME-MARCHING FORMULATION FOR ACOUSTIC ANALYSES*	Lucas Ruffo Pinto, Delfim Soares Jr., Webe João Mansur
18:15	803	*AN ADAPTIVE IMPLICIT-EXPLICIT TIME-MARCHING TECHNIQUE FOR ELASTODYNAMIC ANALYSIS*	Isabelle de Souza Sales, Delfim Soares Jr., Webe João Mansur, Lucas Ruffo Pinto
18:30	835	*OPENFOAM VALIDATION FOR INDOOR VENTILATION APPLICATIONS*	João Mourão Miranda, Guilherme Osswald, Fernando Aristides Castro, Rui A Rego
18:45	901	*A DISCONTINUOUS AND NONLINEAR MULTISCALE METHOD FOR SOLVING CONVECTION-DOMINATED PROBLEMS*	Enéas Mendes de Jesus, Isaac Pinheiro dos Santos
19:00	909	*SIMULATION OF TURBULENT FLOW AROUND A BRIDGE DECK IN OPENFOAM: COMPARISON WITH WIND TUNNEL TEST RESULTS*	José Emanuel da Silva Montiel, Breno Tavares de Godoy, Cleberson da Silva Matos, Amanda Sayuri Oizuni, Laís Corrêa, Fábio Cunha Lofrano, Fernando Akira Kurokawa

*FEUP, **Session B1** – Room: Sala B032 – MS15 (Chairs: Elisabete Silva and Fábio Pinheiro)*

Start	ID	Title	Authors
9:00	794	*NUMERICAL SIMULATION OF THE VAGINAL WALL REINFORCEMENT USING COG THREADS*	Nuno Miguel Ferreira, Maria Elisabete Silva, Fábio Pinheiro, Marco Parente, António Augusto Fernandes
9:15	818	*DEVELOPMENT OF DATA-DRIVEN CONSTITUTIVE MODELS: APPLICATIONS IN THE FINITE ELEMENT SIMULATION OF HYPERELASTIC MATERIALS*	Eduardo da Silva Carvalho, João Pedro Sousa Ferreira, Marco Paulo Lages Parente
9:30	845	*ISOGEOMETRIC ANALYSIS FOR THE PLATELETS ROLE ON SHEAR STRESS EFFECT OVER THE CANCER CELLS INTO THE BLOOD VESSEL*	José Alberto Rodrigues,
9:45	879	*CHARACTERIZATION OF BIODEGRADABLE PCL COG THREADS FOR PELVIC ORGAN PROLAPSE TREATMENT*	Fábio André Teixeira Pinheiro, Maria Elisabete Silva, António Augusto Fernandes

*FEUP, **Session B1** – Room: B032 - MS21 (Chairs: Jorge Belinha and Daniel Rodrigues)*

Start	ID	Title	Authors
10:00	467	*USING A RADIAL POINT INTERPOLATION MESHLESS METHOD FOR THE NUMERICAL SIMULATION OF THE VISCOPLASTIC EXTRUSION PROCESS*	Daniel Rodrigues, Jorge Belinha, Renato Natal Jorge
10:15	793	*A NOVEL SPH ALGORITHM TO SIMULATE TUMOUR ANGIOGENESIS*	Maria Inês Barbosa, Jorge Belinha, Renato Natal Jorge, Ana Xavier de Carvalho
10:30	836	*STRUCTURAL ANALYSIS OF ADHESIVE JOINTS USING MESHLESS METHODS*	Luís D.C. Ramalho, Isidro J. Sánchez-Arce, Diogo C. Gonçalves, Raul D.S.G. Campilho, Jorge Belinha
10:45	808	*RADIAL POINT INTERPOLATION MESHLESS METHODS FOR APPLICATIONS IN MECHANICS AND BIOMECHANICS*	Jorge Belinha

FEUP, ***Session C1*** *– Room: B032 - MS40*

Start	*ID*	*Title*	*Authors*
14:30	589	*STUDY OF THE IMPORTANCE OF MESH REFINEMENT IN THE IMERSPEC METHODOLOGY*	Thiago Rogaleski Marques, Andreia Aoyagui Nascimento
14:45	610	*A COMPARATIVE STUDY ON THE FATIGUE LIFE OF MOORING LINES UNDER COMBINED STRESSES*	Fábio José Coutinho da Silva Filho, Michele Agra de Lemos Martins, Eduardo Nobre Lages, Mauro Costa de Oliveira
15:00	690	*OPTIMIZATION OF PLANE FRAMES USING THE SEARCH GROUP ALGORITHM FOR ECONOMICALLY EFFICIENT STRUCTURAL DESIGN*	Vinicius Borges Balansin, Rafael Holdorf Lopez
15:15	736	*MEAT TENDERNESS PREDICTION USING MACHINE LEARNING: DISTRIBUTION APPLIED TO VARIABLES*	Gabriel Furini, Angelo Polizel Neto, Heinsten Frederich Leal dos Santos
15:30	744	*NUMERICAL MODELING OF A VIBRATION TEST PLATFORM WITH IMBALANCE*	Pedro Augusto de Almeida, Marcos Paulo Miranda Costa, Suzana Moreira Ávila
15:45	770	*DATABASE STRUCTURED MODEL FOR ENERGY PLANNING APPLICATIONS*	Thales C. da Paixão, Igor S. Pinto, Guilherme S. da Silva, Leonardo M. Nakamura, Roberto Asano Jr., Patrícia T. L. Asano
16:00	783	*DRIVE-BY DAMAGE DETECTION IN RAILWAY BRIDGES USING 1D CONVOLUTIONAL NEURAL NETWORKS*	Leonardo Minski, Rafael Holdorf Lopez
16:15	839	*FINITE ELEMENT MODELING OF HEAT TRANSFER MODES IN LOCAL GAP FORMATION DURING SOLIDIFICATION OF CAST COMPONENTS*	Marcelo Franco Magalhães, Jayann Ismar Lira Almeida

*FEUP, **Session D1** – Room: B032 - MS40*

Start	ID	Title	Authors
17:00	846	*IMPLEMENTATION OF THE EULER-RODRIGUES FORMULA TO DEFINE THE INITIAL CONFIGURATION OF OFFSHORE SYSTEMS LINES*	Wydem L. E. Santos, Heleno P. Bezerra Neto, Eduardo N. Lages
17:15	866	*SPATIAL TRANSFORMER-BASED MACHINE LEARNING ARCHITECTURE FOR BRIDGE DAMAGE DETECTION VIA CAR-MOUNTED SENSORS*	Pedro V. Gasparotti de Souza, Rafael Holdorf Lopez
17:30	884	*APPLICATION OF COMPUTATIONAL MODELING AND NUMERICAL SIMULATION FOR THE DEVELOPMENT OF NEW WHEELCHAIR SEAT-BACK SYSTEMS TO IMPROVE POSTURAL ADEQUACY OF CHILDREN WITH MOTOR DISABILITIES*	Olívia Camila Bertino de Almeida, Lucas Duarte Vieira Silva, João Pedro de Barros Souza, Inaldo Viana da Silva Junior, Gabriel Ferreira Santos, Nadège Bouchonneau, Marcus Costa Araujo, Germannya D Garcia Araujo Silva, Juliana Fonseca de Queiroz Marcelino
17:45	887	*FATIGUE LIFE PREDICTION ON STEEL PLATES UNDER VARIABLE RANGE STRESS FROM 2D FEM MODELS*	Bruno Guilherme Corrêa Silva, Silvia Corbani
18:00	889	*APPLICATION OF THE TWO-DIMENSIONAL CARTESIAN FINITE-VOLUME THEORY IN PROBLEMS OF SOLID MECHANICS*	Ana Fernanda de Albuquerque, Laís Manuelle Santos Pereira, Hicaro Raffael Dionizio Silva, Romildo dos Santos Escarpini Filho
18:15	897	*NON NEWTONIAN TRANSPORT IN OPENFOAM: VALIDATION AND APPLICATIONS*	Amanda Sayuri Oizuni, José Emanuel da Silva Montiel, Beatriz Cortez Rodriguez dos Santos, Fábio Cunha Lofrano, Fernando Akira Kurokawa
18:30	706	*MODAL IDENTIFICATION OF DAMAGE IN THE DOWLING HALL PEDESTRIAN FOOTBRIDGE*	Vinícius dos Santos Mota, Nycollas Lima Corrêa de Albuquerque, Cássio Marques R. Gaspar, Elisa Dominguez Sotelino
18:45	880	*COMPREHENSIVE AEROSERVOELASTIC EVALUATION OF A SIMPLIFIED RECTANGULAR WING SUBJECTED TO PARAMETRIC CONTROL ANALYSIS*	Washington Siqueira da Macena, Polliana Candida Oliveira Martins
19:00	789	*PYTHON PROGRAM FOR 3D LINEAR DYNAMIC RETICULAR STRUCTURAL ANALYSIS BASED ON FINITE ELEMENT METHOD*	Gabriel de Carvalho Ferreira, Maria do Socorrro Martins Sampaio

*ISEP, **Session B1** – Room: Sala de Atos – MS17 (Chairs: Gracieli Dienstmann and Sara Rios)*

Start	ID	Title	Authors
9:00	517	*EVALUATION OF THE REDISTRIBUTION OF LOADS IN THE FOUNDATIONS OF REINFORCED CONCRETE STRUCTURES FROM THE COMPUTATIONAL MODELING OF THE CONSTRUCTION SEQUENCE*	Mariana L. A. Costa, Juliane C. Gonçalves
9:15	764	*NUMERICAL ANALYSIS OF LARGE-DIAMETER BORED PILES IN SANDY SOIL*	Naloan Coutinho Sampa, Gabriel Fernando Costa, Fabiano Nienov, João Augusto G.P. Paiva
9:30	824	*PROBABILISTIC ANALYSIS OF EMBANKMENT STABILITY ON SOFT SOILS USING RANDOM FIELDS*	Natalia Ziesmann, Anderson Schmitt, Gracieli Dienstmann
9:45	853	*NUMERICAL SIMULATION OF FLOODING PROCESS OF A COLLAPSIBLE SOIL WITH RAFT FOUNDATION*	Saul Oliveira da Silva, Juan Félix Rodriguez Rebolledo, Belaniza Gaspar Santos Neta, André Luís Brasil Cavalcante
10:00	856	*STABILIZATION OF FILTERED TAILINGS DRY STACKING WITH CEMENTED TAILINGS BERMS: A PARAMETRIC AND LIMIT EQUILIBRIUM ANALYSIS*	Bernardo Roquete Cardoso de Meneses, Sara Rios da Rocha e Silva, António Joaquim Pereira Viana Da Fonseca
10:15	858	*NUMERICAL MODELLING OF CONE PENETRATION TESTING IN LIQUEFIABLE MATERIALS*	Lluís Monforte, Marcos Arroyo, Antonio Gens
10:30	863	*INFLUENCE OF SOIL SPATIAL VARIABILITY ON EMBANKMENT DEFORMATION RELIABILITY ANALYSIS USING THE RANDOM FINITE ELEMENT METHOD*	Juliano Pasa de Campos, André Luis Meier, Natália Ziesmann, Gracieli Dienstmann
10:45	869	*COMPARISON BETWEEN PLAXIS 2D AND CYPE TO SIMULATE AN ANCHORED WALL*	Guilherme Mello, Sara Rios, Alexandre Pinto, Jesus Ruíz, Jorge Barros

*ISEP, **Session C1** – Room: Sala de Atos – MS17 (Chairs: Gracieli Dienstmann and Sara Rios)*

Start	ID	Title	Authors
14:30	903	*EFFECT OF PERMEABILITY ON THE STABILITY CONDITIONS OF A SLOPE THROUGH HYDROMECHANICAL NUMERICAL ANALYSES*	Leonardo Ribeiro, Sara Rios, António Viana da Fonseca, Miguel A. Mánica
14:45	912	*IMPLICIT NUMERICAL INTEGRATION OF AN ADVANCED SUBLOADING SURFACE CLAY AND SAND MODEL*	Paul J. Pinedo, Mohamed Rouainia, Lluís Monforte, Marcos Arroyo, Antonio Gens
15:00	479	*NUMERICAL ANALYSIS OF DAGUANGBAO SLOPE FAILURE IN CHINA INDUCED BY WENCHUAN EARTHQUAKE*	L. Ribeiro e Sousa, Fabricio Fernández, Andre Muller, Eurípedes Vargas Jr., Rita Leal e Sousa, Carlos Sousa Oliveira

*ISEP, **Session C1** – Room: Sala de Atos – MS11 (Chairs: Leonardo Inojosa and João Pantoja)*

Start	ID	Title	Authors
15:15	662	*ARCHITECTURE-STRUCTURE CONCEPTION IN THE DESIGN OF THE CCBB BUILDING IN BRASILIA*	Leonardo da Silveira Pirillo Inojosa, Márcio Augusto Roma Buzar, Lenildo Santos da Silva, Humberto Salazar Amorim Varum
15:30	769	*NUMERICAL SAFETY AND PERFORMANCE ANALYSIS OF A MULTIPURPOSE BUILDING'S STRUCTURE – CASE STUDY*	Leonardo da Silveira Pirillo Inojosa, Márcio Augusto Roma Buzar, Humberto Salazar Amorim Varum, Lenildo Santos da Silva, Marcos Ritter de Gregório, Marco Aurélio de Souza Bessa
15:45	815	*COMPARATIVE ANALYSIS OF THE STRUCTURAL SYSTEMS OF BLOCKS A AND B OF THE ARCHITECTURAL SET OF THE ATTORNEY GENERAL OF THE REPUBLIC OF BRAZIL, BRASÍLIA, DF*	Stefano Galimi, Márcio Augusto Roma Buzar, Joao Pantoja, Valmor Cerqueira Pazos, Ana Luiza Alves de Oliveira
16:00	817	*STRUCTURAL DEGRADATION ASSESSMENT OF RC BUILDINGS: APPLICATION VIA SOFTWARE OF THE METHOD OF ASSESSMENT BY INTEGRITY AND SAFETY - MAIS METHOD - IN A HERITAGE CASE STUDY IN BRASILIA*	Ana Luiza de Oliveira, João Pantoja, Humberto Varum, Stefano Galimi
16:15	804	*ANALYSIS OF THE BATTISTERO DI SAN GIOVANNI'S BEHAVIOR SUBJECTED TO SEISMIC EVENTS*	Sabrina L. F. Vitorino, Roberto Corazzi, Graciela Doz

ISEP, ***Session D1*** *– Room: Sala de Atos – MS11 (Chairs: Leonardo Inojosa and João Pantoja)*

Start	*ID*	*Title*	*Authors*
17:00	865	*SEISMIC VULNERABILITY ASSESSMENT OF EXISTING REINFORCED CONCRETE BUILDING RELIABILITY-BASED*	Philipe Queiroz Rodrigues, João da Costa Pantoja, Humberto Salazar Amorim Varum
17:15	870	*NUMERICAL ANALYSIS OF VIBRATIONS OF CABLE AND TOWER OF ELECTRIC POWER TRANSMISSION LINES*	Jonas Yamashita de Farias, Ramon Saleno Yure Rubim Costa Silva, Antonio Carlos de Oliveira Miranda, Marlos José Ribeiro Guimarães
17:30	792	*PHASE-FIELD MODELLING OF RAMDOMLY REPRESENTATIVE VOLUME ELEMENTS*	Hugo M. Leão, Saulo S. de Castro, Roque L. da S. Pirangueira, Lapo Gori

ISEP, ***Session D1*** *– Room: Sala de Atos – MS05 (Chair: Eduardo M. B. Campello)*

Start	*ID*	*Title*	*Authors*
17:45	697	*TOWARDS A GENERAL MULTISCALE METHODOLOGY FOR THE SIMULATION OF THERMAL BEHAVIOR OF GRANULAR MEDIA*	Rafael L. Rangel, Juan M. Gimenez, Alessandro Franci
18:00	837	*SIMULATION OF FRESH CONCRETE SLUMP TEST WITH THE MATERIAL POINT METHOD*	Leonardo Tolêdo Ferreira, Tiago Peixoto da Silva Lôbo, Ricardo Albuquerque Fernandes, Lucas Gouveia Omena Lopes, Lorran Ferreira Oliveira, Luciana Correia Laurindo Martins Vieira, Adeildo Soares Ramos Júnior
18:15	851	*AN ANALYSIS OF WATER HAMMER PIPE FLOW WITH UNSTEADY FRICTION MODEL USING THE SPH METHOD*	Almério José Venâncio Pains Soares Pamplona, José Fernandes Júnior, Joel Roberto Guimarães Vasco, Andreia Aoyagui Nascimento
18:30	876	*DISCRETE ELEMENT MODELING FOR PREDICTING 3D-PRINTED CONCRETE PROCESS PARAMETERS*	Victor Hugo M. Avancini, Osvaldo D. Quintana-Ruiz, Eduardo M. B. Campello
18:45	773	*GAS-LIFT SIMULATION USING SMOOTHED PARTICLE HYDRODYNAMICS*	Naim Jessé dos Santos Carvalho, Livia Flavia Carleti Jatoba, Grazione de Souza, Helio Pedro Amaral Souto

ISEP, ***Session B1*** *– Room: Sala de Reuniões – MS13 (Chairs: Evandro Parente and Elcio Alves)*

Start	***ID***	***Title***	***Authors***
9:00	519	*TRI-OBJECTIVE OPTIMIZATION OF 3D STEEL FRAMES CONSIDERING COLUMNS ORIENTATION AND BRACING SYSTEM CONFIGURATION AS DESIGN VARIABLES*	Cláudio Horta Barbosa de Resende, Luiz Fernando Martha, Afonso Celso de Castro Lemonge
9:15	664	*COMPUTATIONAL MODEL FOR THE OPTIMIZATION OF THE GENERATION OF THERMAL POWER PLANTS IN BRAZIL*	Dayana Kaiser Kuchenbecker, Patricia Teixeira Leite Asano, Fabiana Oliveira Ferreira, Ivo Chaves Silva Junior
9:30	669	*SOLUTION OF BOUND CONSTRAINED NONLINEAR LEAST SQUARES PROBLEMS WITH APPLICATION TO BACKCALCULATION OF ASPHALT PAVEMENTS*	Lia Beatriz Gomes Furtado, Evandro Parente Junior, Elias Saraiva Barroso, Lucas Feitosa de Albuquerque Lima Babadopulos, Juceline Batista dos Santos Bastos
9:45	677	*METAMODEL-ASSISTED METAHEURISTIC FOR STRUCTURAL OPTIMIZATION PROBLEMS*	Érica da Costa Reis Carvalho, Afonso Celso de Castro Lemonge, Kenedy Guedes Fernandes Júnior, Patrícia Habbib Hallak
10:00	680	*SENSITIVITY ANALYSIS OF FLEXIBLE MULTIBODY SYSTEMS WITH NONLINEAR BEAMS*	Juan Carlos García Orden, Juan José Arribas Montejo, Felipe Gabaldón Castillo, Daniel Dopico Dopico
10:15	778	*ANALYSIS OF CO2 EMISSIONS IN THE TOPOLOGICAL OPTIMIZATION OF FLOOR SYSTEMS COMPOSED BY COMPOSITE TRUSSES*	Elcio Cassimiro Alves, Chayana Gomes Morgner, Beatriz Vargas Afonso, Isabela Oliveira Maia da Silva, Adenílcia Fernanda Grobério Calenzani
10:30	786	*MULTI-OBJECTIVE HARMONY SEARCH APPLIED TO MINIMIZE COST AND DISPLACEMENT OF STEEL-CONCRETE COMPOSITE BEAMS*	Moacir Kripka, Fernando Luiz Tres Junior, Guilherme Fleith de Medeiros
10:45	801	*OPTIMAL RECONFIGURATION OF THE ELETRIC POWER DISTRIBUTION NETWORK WITH HIGH PHOTOVOLTAIC GENERATION AND OVERVOLTAGE*	Yanick Rodolfo Gomes, Diego Jose da Silva, Edmarcio Antonio Belati

ISEP, ***Session C1*** *– Room: Sala de Reuniões – MS13 (Chairs: Silvana Silva and Elias Barroso)*

Start	*ID*	*Title*	*Authors*
14:30	826	*NUMERICAL MODELING TO EVALUATE THE IMPACTS OF WATER TRANSFER BETWEEN RIVERS IN THE HENRY BORDEN HYDROELECTRIC COMPLEX.*	Guilherme Geremias Prata, Karen F. de Paula, Roseli F. Benassi, Patrícia T. L. Assno, Eduardo L. Subtil, Werner S. Hanisch, Fabiana de O. Ferreira
14:45	830	*AUTOMATED APPROACH FOR MULTI-OBJECTIVE OPTIMIZATION OF STEEL TRUSSES USING GENETIC ALGORITHMS AND RELIABILITY*	Marcio Maciel da Silva, Francisco de Assis das Neves, Hélio Luiz Simonetti, Marcilio Sousa da Rocha Freitas
15:00	834	*OPTIMIZATION OF A BELT CONVEYOR ROLLER THROUGH A DIMENSIONAL/LATTICE HYBRID STRATEGY AND SURROGATE MODELING*	Ricardo Augusto Terui Hartmann, Marco Antonio Luersen, Laercio Javarez Junior
15:15	532	*A PHASE-FIELD MODEL TO SIMULATE HYDRAULIC FRACTURE PROPAGATION*	Eduarda Marques Ferreira, Roque Luiz da Silva Pitangueira, Lapo Gori

ISEP, ***Session C1*** *– Room: Sala de Reuniões – MS12 (Chairs: Luiz Fernando Martha and António Miranda)*

Start	*ID*	*Title*	*Authors*
15:30	790	*PYTHON PROGRAM FOR 3D LINEAR STATIC RETICULAR STRUCTURAL ANALYSIS BASED ON FINITE ELEMENT METHOD*	Gabriel de Carvalho Ferreira, Maria do Socorro Martins Sampaio
15:45	882	*MODELING IN DIGITAL ROCK ANALYSIS: AN IMAGE SEGMENTATION TUTORIAL*	Andre Maues Brabo Pereira, Felipe F. Alves, João Leal, Ricardo Leiderman
16:00	888	*ISOGEOMETRIC ANALYSIS WITH INTERACTIVE MODELING OF MULTI-PATCHES NURBS*	João Carlos L. Peixoto, Rafael L. Rangel, Luiz F. Martha
16:15	902	*LESM: AN INTERACTIVE-GRAPHICS OPEN-SOURCE EDUCATIONAL SOFTWARE IN MATLAB FOR STATIC AND DYNAMIC STRUCTURAL ANALYSIS*	Luiz F. Martha, Cláudio H. B. Resende, Pedro C. Lopes, Rafael L. Rangel

ISEP, ***Session D1*** *– Room: Sala de Reuniões – MS27 (Chairs: Jorge Belinha and Alfredo Gay Neto)*

Start	*ID*	*Title*	*Authors*
17:00	627	*EXPLAINABILITY ANALYSIS OF A MACHINE LEARNING-BASED CONSTITUTIVE MODEL FOR CONCRETE*	Saulo Silvestre de Castro, Álefe Freitas Figueiredo, Roque Luiz da Silva Pitangueira
17:15	765	*A HYBRID LEARNING MODEL FOR ASSESSMENT BEAM DAMAGE DETECTION*	Amanda Aryda Silva Rodrigues de Sousa, Jefferson da Silva Coelho, Marcela Rodrigues Machado, Maciej Dutkiewicz
17:30	813	*EVALUATING THE INFLUENCE OF LOSS FUNCTION ON PERFORMANCE OF A NEURAL NETWORK FOR PARTICLE 3D SHAPE RECONSTRUCTION FROM 2D PROJECTIONS*	Danilo Menezes Santos, Alfredo Gay Neto
17:45	831	*COMBINING NEURAL NETWORKS WITH MULTISCALE TECHNIQUES FOR LATTICE UNIT CELL DESIGN*	Ana Pais, Jorge Lino Alves, Jorge Belinha
18:00	875	*THE APPLICATION OF BOOSTING ALGORITHMS IN THE PREDICTION OF BOND STRENGTH BETWEEN THIN STEEL BARS AND CONCRETE*	Vanderci Fernandes Arruda, Gray F. Moita, Eliene P. Carvalho, Priscila F. S. Silva, Marco A. A. Grossi
18:15	895	*AN APPROACH FOR DISPLACEMENT PREDICTION IN TRUSS STRUCTURES COMBINING THE FINITE ELEMENT METHOD AND DEEP LEARNING TECHNIQUES*	Mateus de Paula Ferreira, Elisa Dominguez Sotelino
18:30	913	*ADVANCING STRUCTURAL DESIGN WITH MACHINE LEARNING: STRESS FIELD PREDICTION IN PLATES WITH CUTOUTS*	J.A. Ribeiro, B.A. Ribeiro, H. Penedones, L. Sarmento, S.M.O. Tavares
18:45	920	*AIRCRAFT STRUCTURES LIFE-CYCLE SIMULATION THROUGH DIGITAL TWINS AND MODEL UPDATING TECHNIQUES*	JS.M.O. Tavares, J.A. Ribeiro, J. Belinha, P.M.S.T. de Castro

DAY 3: 15 OF NOVEMBER

*FEUP, **Session E1** – Room: Auditório – MS28 (Chairs: Diogo Ribeiro and Luísa Sousa)*

Start	ID	Title	Authors
8:30	518	*EXPERIMENTALLY ESTIMATED BIPEDAL MODEL PARAMETERS TO SIMULATE HUMAN-INDUCED VIBRATIONS ON FOOTBRIDGES*	Dianelys Vega Ruiz, Carlos Magluta, Ney Roitman
8:45	523	*NONLINEAR DYNAMIC ANALYSIS OF NON-IDEAL MOTOR FOUNDATIONS*	Henrique Zarnauskas Dias de Souza Vieira, Carlos Eduardo Nigro Mazzilli
9:00	857	*REGULARIZATION OF COMPLEX FLEXIBILITY OF LAYERED MODELS OF RAILWAY TRACK*	Zuzana Dimitrovová
9:15	604	*ON THE EFFECT OF MANUFACTURING IMPERFECTIONS AND INTERNAL DAMAGE ON THE COLLAPSE STRENGTH OF TUBES: A NONLINEAR PERSPECTIVE*	Lucas Pereira de Gouveia, Eduardo Nobre Lages, Eduardo Toledo de Lima Junior
9:30	534	*MODEL MIXING WITH FREQUENCY BASED SUBSTRUCTURING: 4 DOF HALF-VEHICLE ANALYSIS*	Lucas Costa Arslanian, Marcus Vinicius Girão de Morais
9:45	606	*STUDY ON THE USE OF PASSIVE CONTROL SYSTEMS IN THE DYNAMIC RESPONSE OF COUPLED BUILDINGS*	Rafael Caricchio Cabral Tavares, Marcus Vinicius Girão de Morais, Suzana Moreira Avila, Graciela Doz
10:00	714	*SIMPLE EQUATION TO ACCOUNT FOR THE HUMAN-STRUCTURE INTERACTION EFFECTS ON THE MODAL DAMPING OF FOOTBRIDGES*	Igor Braz do Nascimento Gonzaga, Michèle Schubert Pfeil, Wendell Diniz Varela
10:15	720	*STABLE HIGH ORDER SPACE-TIME FINITE ELEMENT FORMULATION FOR LARGE DISPLACEMENT ELASTODYNAMICS*	Darcy Hannah Falcão Rangel Moreira, Weslley Camargo Lopes, Rodolfo André Kuche Sanches
10:30	523	*NONLINEAR DYNAMIC ANALYSIS OF NON-IDEAL MOTOR FOUNDATIONS*	Henrique Zarnauskas Dias de Souza Vieira, Carlos Eduardo Nigro Mazzilli
10:45	771	*STRUCTURAL DYNAMIC ANALYSIS CONSIDERING A LOCALLY-DEFINED TIME INTEGRATION PROCEDURE*	Antonio Carlos Luna Lins Cavalcanti, Webe João Mansur, Delfim Soares Jr.

*FEUP, **Session F1** – Room: Auditório – MS28 (Chairs: Jorge Belinha and Ramiro Martins)*

Start	*ID*	*Title*	*Authors*
11:45	776	*NONLINEAR DYNAMICS IN GRADED WATERBOMB ORIGAMI TUBES*	Americo Cunha Jr, Glaucio H Paulino
12:00	838	*VULNERABILITY ASSESSMENT OF REINFORCED CONCRETE (RC) STRUCTURES BASED ON MODAL PARAMETERS*	R. Shafie Panah, H. Varum, V. Silva, J. Melo, X. Romão
12:15	867	*ELASTIC BUCKLING LOAD PREDICTION OF TAPERED STEEL COLUMNS VIA ARTIFICIAL NEURAL NETWORKS*	Anelise Dick, Rui Carneiro de Barros, Manuel Teixeira Braz-César

*FEUP, **Session E1** – Sala de Atos – MS02 (Chairs: José Guilherme da Silva and Ricardo A. M. Silveira)*

Start	ID	Title	Authors
8:30	489	*GENERALIZED DIRECT STRENGTH DESIGN APPROACH: STEEL COLD-FORMED COLUMNS UNDER BUCKLING MODE INTERACTION*	Eduardo de Miranda Batista, Gustavo Yoshio Matsubara
8:45	647	*VIBRATION ANALYSIS AND HUMAN COMFORT ASSESSMENT OF COMPOSITE FLOORS SUBJECTED TO DYNAMIC LOADS INDUCED BY GROUPS OF PEOPLE*	Elisângela Arêas Richter dos Santos, Felipe Almeida de Sousa, José Guilherme Santos da Silva
9:00	648	*INFLUENCE OF THE GEOMETRIC NONLINEARITY AND THE AERODYNAMIC DAMPING ON THE DYNAMIC RESPONSE OF TALL BUILDINGS*	Jean Carlos Mota Silva, Juliana Mattos Farias, José Guilherme Santos da Silva
9:15	649	*DYNAMIC STRUCTURAL ANALYSIS OF TRANSMISSION LINES STEEL TOWERS SUBJECTED TO NONDETERMINISTIC WIND LOADINGS*	Mariana Souza Rechtman, José Guilherme Santos da Silva
9:30	695	*NUMERICAL ANALYSIS OF THE STRESSES AND BEHAVIOR OF COMPOSITE CASTELLATED BEAMS*	Brenda Vieira Costa Fontes, Luciano Mendes Bezerra, William Taylor Matias Silva
9:45	785	*OPTIMUM DESIGN OF CONTINUOUS COMPOSITE SLAB USING PARTICLE SWARM OPTIMIZATION*	Mariana Oliveira Teixeira, Élcio Cassimiro Alves, Janaina Pena Soares de Oliveira Valle, Adenilcia Fernanda Grobério Calenzani
10:00	797	*ADVANCED PARAMETRIC MODELLING OF PYRAMIDAL TRUSSES*	Jackson da Silva Rocha Segundo, Ricardo Azoubel da Mota Silveira, Rafael Cesário Barros, Dalilah Pires, Ígor José Mendes Lemes
10:15	850	*NUMERICAL SIMULATION OF FPCB SHEAR CONNECTORS FOR THIN SHEETS*	ARIANY CARDOSO PEREIRA, RODRIGO BARRETO CALDAS, Cristiane C. C. Lopes
10:30	905	*PATH FOLLOWING STRATEGIES FOR NON-LINEAR ANALYSIS OF STEEL-CONCRETE COMPOSITE SECTIONS: A BI-AXIAL BENDING EVALUATION*	Pedro H.A. Lima, Igor J.M. Lemes, Ricardo A.M. Silveira, Rafael C. Barros
10:45	906	*TIMBER CROSS-SECTION VERIFICATION IN FIRE SITUATION*	Jackson S. Rocha Segundo, Caroline A. Ferreira, Ricardo A. M. Silveira, Rafael C. Barros, Dalilah Pires, Igor J.M. Lemes

*FEUP, **Session F1** – Room: Sala de Atos – MS33 (Chairs: José Luis Drummond Alves, José L.D. Alves and Maira Santo)*

Start	ID	Title	Authors
11:45	644	*A NEW METHOD FOR SUB-RESOLUTION POROSITY MODELLING ON ROCK SAMPLES USING X-RAY MICROTOMOGRAPHY AND PORE NETWORK MODELLING TECHNIQUES*	Rafael Augusto Bastos Rodrigues Alves, José Luis Drummond Alves, Maira da Costa de Oliveira Lima Santo, William Godoy de Azevedo Lopes da Silva, Elizabeth May Pontedeiro, Paulo Couto
12:00	886	*PORE SCALE EXPERIMENTAL SIMULATION OF WATER FLOW IN ACIDIFIED CARBONATE ROCK BASED ON TOMOGRAPHIC IMAGING*	Victoria FarçaL Rocha da Costa, Leonardo José do Nascimento Guimarães, Anny Vírginia Souza de Lima, Daniel Amancio Duarte, Marcos Allyson Felipe Rodrigues, Guilherme Mentges Arruda
12:15	915	*EFFECTS OF PERMEABILITY AND PORE CONNECTIVITY ON GAS TRAPPING IN CARBONATE ROCKS*	Caroline H. Dias, Carlos C. Júnior, Matheus G. Ramirez, Felipe Eler, Maira Lima, Paulo Couto

*FEUP, **Session F1** – Room: Sala de Atos – MS29 + MS36 (Chair: Thiago Doca)*

Start	ID	Title	Authors
12:30	460	*FEM SIMULATION OF ORTHOGONAL MACHINING OF AL 6101-T6 AND INCONEL 718 USING JOHNSON-COOK CONSTITUTIVE MODEL*	Gabriel de Paiva Silva, Leonel Leonardo Delgado Morales, Déborah de Oliveira, Lucival Malcher
12:45	529	*FATIGUE LIFE ESTIMATE IN METALLIC CHAINS LINKS OF MOORING SYSTEM*	Lucas de Oliveira Barros, Leonel Leonardo Delgado Morales, Lucival Malcher
13:00	841	*ASSESSMENT OF PHYSICS-INFORMED NEURAL NETWORKS FOR THE MECHANICAL CHARACTERIZATION OF VISCOPLASTIC MATERIALS*	T. Doca, P.G. Marques Flávio, L. Pupure
13:15	843	*ANALYSIS ON 3D FRETTING CONTACT STRESSES ALONG THICKNESS UNDER FATIGUE LOAD*	Danilo Rangel de Sousa Resende, Thiago Doca, José Alexander Araújo

*FEUP, **Session E1** – Room: B032 – MS37 (Chairs: Andreia Meixedo and Araliya Mosleh)*

Start	ID	Title	Authors
8:30	691	*DRIVE-BY DAMAGE DETECTION IN RAILWAY BRIDGES SUBJECT TO OPERATIONAL VARIABILITIES USING DEEP AUTOENCODER*	Thiago Moreno Fernandes, Rafael Holdorf Lopez, Diogo Rodrigo Ferreira Ribeiro
8:45	607	*CLUSTERING-BASED CLASSIFICATION OF POLYGONAL WHEELS IN FREIGHT TRAINS BASED ON WAYSIDE MONITORING*	António Guedes, Rúben Silva, Tomás Jorge, Jorge Magalhães, Diogo Ribeiro, Andreia Meixedo, Araliya Mosleh, Cecília Vale, Pedro Montenegro
9:00	639	*OUT-OF-ROUNDNESS DAMAGE WHEELS IDENTIFICATION IN A FREIGHT RAILWAY VEHICLE USING A STACKED SPARSE AUTOENCODER*	Tomás Jorge, Jorge Magalhães, Rúben Silva, António Guedes, Diogo Ribeiro, Andreia Meixedo, Araliya Mosleh, Cecília Vale, Pedro Montenegro, Alexandre Cury
9:15	515	*INFLUENCE OF TRACK AND VEHICLE WHEEL DAMAGES IN THE TRAIN RUNNING SAFETY*	Maria Lurdes Simões, Cecília Vale, Pedro Montenegro, Rúben Silva
9:30	852	*APPLICATION OF A SPARSE AUTOENCODER MODEL FOR OOR DAMAGE WHEELS IDENTIFICATION IN A PASSENGER TRAIN USING WAYSIDE TRACK RESPONSES*	Jorge Rui Barroso Magalhães, Tomás Jorge, António Guedes, Diogo Ribeiro, Rúben Silva, Andreia Meixedo, Araliya Mosleh, Cecília Vale, Pedro Montenegro, Alexandre Cury
9:45	890	*ENVELOPE SPECTRUM ANALYSIS WITH ALGORITHM SIMULATIONS TO DETECT RAILWAY WHEEL OUT-OF-ROUNDNESS DEFECTS*	Vítor Gonçalves, Araliya Mosleh, Cecília Vale, Pedro Aires Montenegro
10:00	900	*AI-DRIVEN METHODOLOGY FOR EARLY DETECTION OF UNBALANCED LOADS IN FREIGHT RAILWAY VEHICLES USING A WAYSIDE SYSTEM*	Ruben Silva, Cássio Bragança, António Guedes, Diogo Ribeiro, Andreia Meixedo, Araliya Mosleh, Cecília Vale, Pedro Montenegro, Túlio Bittencourt, Edson Florentino

*FEUP, **Session F1** – Room: B032 – MS26 (Chairs: Cláudio Horas, Aires Colaço and Ana Ramos)*

Start	*ID*	*Title*	*Authors*
11:45	763	*NUMERICAL ANALYSIS OF A REINFORCED CONCRETE RAILWAY BRIDGE CONSIDERING SOIL-STRUCTURE INTERACTION*	André Luís Gamino, Ruan Richelly Santos, Eduardo Costa Granato, Túlio Nogueira Bittencourt, Hermes Carvalho, Marcos Massao Futai
12:00	772	*ANALYSIS OF THE PERFORMANCE OF A BALLASTED TRACK IN A TRANSITION ZONE*	Ana Ramos, António Gomes Correia, Rui Calçada
12:15	822	*DYNAMIC ANALYSIS OF A PRESTRESSED CONCRETE RAILWAY BRIDGE CONSIDERING CYCLIC FATIGUE LOAD DUE TO RAILWAY TRAFFIC*	Fernando Luiz Martinechen Beghetto,
12:30	860	*INDIRECT ANALYSIS OF RAILWAY INFRASTRUCTURE ANOMALIES USING PASSENGER COMFORT CRITERIA*	Patrícia Silva, Diogo Ribeiro, Pedro Pratas, Joaquim Mendes, Eurico Seabra
12:45	904	*ENHANCED FATIGUE LIFE PREDICTION IN ANCIENT RIVETED METALLIC RAILWAY BRIDGES*	Cláudio Horas, João Silva, José Correia, Abílio de Jesus, Rui Calçada
13:00	917	*PREDICTION OF VIBRATIONS INDUCED BY RAILWAY TRAFFIC USING A SURROGATE MODEL*	Aires Colaço, Ana Ramos, Pedro Alves Costa, Mohammed Hussein

ISEP, ***Session E1*** *– Room: Auditório Vítor Santos – MS01 (Chair: Reyolando Brasil)*

Start	*ID*	*Title*	*Authors*
8:30	456	*DYNAMIC BUCKLING OF SLENDER VARIABLE SECTION MEMBERS TO SELF-WEIGHT*	Reyolando M.L.R.F. Brasil
8:45	476	*TMD'S OPTIMIZATION FOR DYNAMIC ANALYSIS OF WALKWAYS EXCITED BY PSEUDORANDOM PEDESTRIAN'S LOAD*	Victor Casulli de Oliveira, Reyolando Manoel Lopes Rebello da Fonseca Brasil
9:00	477	*NONLINEAR DYNAMIC ANALYSIS OF GUYED MAST UNDER RANDOM AERODYNAMIC LOADING*	Marcelo G. Magalhães, Reyolando M.L.R.F. Brasil
9:15	499	*ENERGY HARVESTING USING A PIEZOELECTRIC NONLINEAR ENERGY SINK (PNES) TO AN AEROELASTIC SYSTEM*	Ana Carolina Godoy Amaral, Marcos Silveira
9:30	503	*SATELLITE ACS DESIGN DURING ORBIT INJECTION USING THE SDRE METHOD*	Luiz Carlos Gadelha de Souza,
9:45	689	*QUAD LAMINATES AEROELASTIC INSTABILITY*	Helio de Assis Pegado
10:00	740	*ANALYSIS OF A HYDROGEN FLYING AIRPLANE*	De Aguiar, João B., Tacksian, Isadora F., De Aguiar, José M.
10:15	655	*STUDY OF THE EFFECT OF PRESSURIZATION ON THE VIBRATION FREQUENCIES OF FUSELAGES*	Kaique M. M. Magalhães, Reyolando M. L. R. F. Brasil, Alexandre M. Wahrhaftig
10:30	704	*DYNAMIC ANALYSIS OF TRANSVERSAL RESPONSE DUE TO MOVING MASS IN A CONTINUOUS BEAM*	BADDYO KARPPEGGYANE SANTANA PEREIRA DA SILVA, REYOLANDO MANOEL LOPES REBELLO DA FONSECA BRASIL

ISEP, ***Session F1*** *– Room: Auditório Vítor Santos – MS04 (Chairs: Paulo R. M. Lyra and Darlan K. E. de Carvalho)*

Start	*ID*	*Title*	*Authors*
11:45	482	*A 3-D EXTENSION OF THE MULTISCALE CONTROL VOLUME METHOD FOR THE SIMULATION OF THE STEADY-STATE DIFFUSION EQUATION*	Filipe A. C. S. Alves, Artur C. R. de Souza, Darlan K. E. de Carvalho, Paulo Roberto Maciel Lyra
12:00	520	*A MULTISCALE FINITE ELEMENT METHOD FOR SIMULATING FLOW IN FRACTURED POROUS MEDIA*	Nathan Shauer, Jose B. Villegas S., Pedro Lima, Philippe Remy Bernard Devloo
12:15	638	*A MULTIPOINT FLUX APPROXIMATION METHOD BASED OF HARMONIC POINTS (MPFA-H) FOR THE NUMERICAL SIMULATION OF COUPLED POROELASTIC PROBLEMS*	Pedro Victor Paixão Albuquerque, Jonathan da Cunha Teixeira, Lucíolo Victor Magalhães e Silva, Gustavo Lenin Souza Santos Pacheco, Fernando Raul Licapa Contreras, Paulo Roberto Maciel Lyra, Darlan Karlo Elisário de Carvalho
12:30	658	*NUMERICAL ASSESSMENT OF PRESSURE, VELOCITY, AND STRESS POST-PROCESSING STRATEGIES FOR THE BIOT'S PROBLEM*	Giovanni Taraschi, Maicon Ribeiro Correa
12:45	728	*A METHODOLOGY TO EVALUATE FLUID-DYNAMIC FORCES ON IMMERSED BODIES IN 3D FLUID FLOW PROBLEMS*	Andre Sarkis Muller, Henrique Campelo Gomes, Eduardo M. B. Campelo
13:00	760	*AN IMPROVED EMBEDDED FINITE ELEMENT FORMULATION FOR INVESTIGATING FLUID FLOW BEHAVIOR IN FRACTURED POROUS MEDIA*	Danilo Borges Cavalcanti, Cristian Mejia, Deane Roehl, Luiz Fernando Martha, Ignasi de Pouplana, Guillermo Casas
13:15	910	*A MULTIPOINT FLUX APPROXIMATION METHOD BASED ON HARMONIC POINTS TO SIMULATE HIGHLY HETEROGENEOUS AND ANISOTROPIC AQUIFERS*	Fernando Raul Licapa Contreras, Darleson Luiz Alves de Oliveira, Paulo Roberto Maciel Lyra, Alessandro Romario Echevarria Antunes, Darlan Karlo Elisiario de Carvalho

ISEP, ***Session E1*** *– Room: Sala de Atos – MS06 (Chairs: Bruno da Fonseca Monteiro and Juliana Souza Baioco)*

Start	ID	Title	Authors
8:30	510	*NUMERICAL SIMULATION OF THE STRESS-STRAIN BEHAVIOR OF POLYMERIC FIBERS FOR MOORING OFFSHORE STRUCTURES*	Daniel Magalhães da Cruz, Marcelo de Ávila Barreto, Larissa Basei Zangalli, Felipe Tempel Stumpf, Jakson Manfredini Vassoler, Carlos Eduardo Marcos Guilherme
8:45	800	*TOWARDS A METHODOLOGY TO ESTIMATE ENVIRONMENTAL LOADINGS FROM TIME HISTORY MOTIONS OF OFFSHORE PLATFORM BY USING ARTIFICIAL NEURAL NETWORKS*	Bruno da Fonseca Monteiro, Carl Horst Albrecht, Breno Pinheiro Jacob
9:00	816	*FINITE ELEMENT ANALYSIS OF A NORSOK L005 BALL VALVE FOR OIL & GAS APPLICATIONS*	Felipe Frizon, Diego Rizzotto Rossetto, Diógenes Barbosa Teles
9:15	828	*SENSITIVITY ANALYSIS OF PRODUCTION PARAMETERS IN MULTIPHASE FLOW SIMULATIONS*	Philip Stape, Murilo F. Rapozo, Juliana Souza Baioco, Luis F. Mazadiego Martínez, Breno P. Jacob
9:30	833	*USING METAMATERIAL TO CONTROL OFFSHORE WIND TURBINE VIBRATIONS*	Marcela Rodrigues Machado, Maciej Dutkiewicz
9:45	859	*EVALUATION OF EXTREME CONDITIONS FOR TRANSPORTATION OF OFFSHORE DRILLING EQUIPMENT USING RISER COLUMN*	Aline Esperança de Sá Freitas, Fabrício Nogueira Corrêa, Bruno Martins Jacovazzo, Breno Pinheiro Jacob
10:00	862	*NONLINEAR DYNAMIC STRUCTURAL OPTIMIZATION OF OFFSHORE STRUCTURES USING EQUIVALENT STATIC MODELS*	GABRIEL ROCHA DOMINGOS, EDUARDO NOBRE LAGES, ADEILDO SOARES RAMOS JUNIOR, ANDERSON TAKEHIRO OSHIRO, MAURO COSTA DE OLIVEIRA
10:15	872	*TOWARDS THE GLOBAL ANALYSIS OF SOIL AND RISER INTERACTION USING A DEGRADATION SOIL MODEL*	Edgar S.B. Micolo, Fabrício N. Correa, Breno P. Jacob
10:30	896	*STREAMLINING NONLINEAR BLAST ANALYSIS FOR EFFICIENT STRUCTURAL DESIGN OF OFFSHORE PLATFORMS*	André Luiz Ladeira de Sosa Lima, Lucas Diego de Freitas Lino, Eduardo Setton Sampaio da Silveira, Tiago Peixoto da Silva Lôbo, Christian Carneiro de Oliveira, Gabriel de Carvalho Freitas, Dilnei Schmidt

ISEP, ***Session F1*** *– Room: Sala de Atos – MS22 (Chair: Sónia Pinto)*

Start	***ID***	***Title***	***Authors***
11:45	470	*SUBCLINICAL GENDER-SPECIFIC DIFFERENCES IN ARTERIAL CAROTID STIFFNESS - A REVIEW*	Catarina F. Castro
12:00	473	*MODELLING THE HEMODYNAMICS IN A REALISTIC CEREBRAL ANEURYSM WITH CLOT THROUGH TRANSIENT FSI SIMULATIONS*	Concepción Paz, Eduardo Suárez, Adrián Cabarcos, Sónia I.S. Pinto
12:15	781	*EXPLORING XNAT TO FOSTER DEVELOPMENT AND TESTING OF IMAGE PROCESSING METHODS FOR CLINICAL SETTINGS: PRELIMINARY RESULTS*	Samuel Silva, João Abrantes
12:30	811	*COMPUTATIONAL METHODS TO PREDICT THE FRACTIONAL FLOW RESERVE IN CORONARY ARTERIES - A LITERATURE REVIEW*	M. Fernandes, L.C. Sousa, C.C. António, S.I.S. Pinto
12:45	812	*EXPLORING A PYTHON-BASED SEMI-AUTOMATIC APPROACH FOR CORONARY ARTERY SEGMENTATION*	João Festas, C. C. Antonio, L. C. Sousa, S. Silva, S. I. S. Pinto

*ISEP, **Session E1** – Room: Sala de Reuniões – MS03 (Chair: Gilberto Gomes)*

Start	ID	Title	Authors
8:45	485	*CRACK DETECTION IN 2D STRUCTURES USING WAVELET TRANSFORM AND THE BOUNDARY ELEMENT METHOD.*	Sá. Rafael, G.Gilberto, S. Ramon
9:00	490	*BEMLAB2D & BEMCRACKER2D: A COMPUTATIONAL PACKAGE FOR MODELING AND ANALYZING FRACTURE MECHANICS PROBLEMS WITH BOUNDARY ELEMENTS*	Gilberto Gomes, Iuri A A Lustosa, Alan da Silva Moura

*ISEP, **Session E1** – Room: Sala de Reuniões – MS18 (Chair: Emilio Carlos Nelli Silva)*

Start	ID	Title	Authors
9:15	508	*RELIABILITY-BASED OPTIMIZATION OF EVOLUTIONARY TOPOLOGY AND AUTOMATED GENERATION OF STRUT-AND-TIE MODELS FOR 3D STRUCTURES*	Hélio Luiz Simonetti, Valério Silva Almeida, Virgil Del Duca Almeida, Sina Zhian Azar, Vitor Manuel A. Leitão
9:30	560	*TOPOLOGY OPTIMIZATION OF A SOLAR-POWERED BOAT*	Igor Barros Baraçal, Renato Picelli Sanchez
9:45	567	*A SMOOTH BOUNDARY EXTRACTION TECHNIQUE FOR TOPOLOGY OPTIMIZATION WITH BINARY DESIGN VARIABLES AND A GEOMETRY TRIMMING PROCEDURE*	Lucas Oliveira Siqueira, Rômulo Luz Cortez, Emílio Carlos Nelli Silva, Renato Picelli
10:00	634	*LABYRINTH DIODE DESIGNED BY TOPOLOGY OPTIMIZATION OF BINARY STRUCTURES USING LAMINAR FLOW AND REAL GAS PROPERTIES WITH EXPERIMENTAL VALIDATION*	Lucas Neves Braga Soares Ribeiro, Andersom Soares da Costa Azevêdo, Renato Picelli, Emílio Carlos Nelli Silva
10:15	659	*CONCEPTUAL DESIGN OF STEAM TURBINE LABYRINTH SEALS CONSIDERING THERMAL COMPENSATION AND TOPOLOGY OPTIMIZATION*	Wilfredo Montealegre Rubio, Emilio Carlos Nelli Silva, Edilson Sarmiento Alonso
10:30	868	*LATTICE STRUCTURES DESIGN BASED ON TOPOLOGY OPTIMIZATION: MODELING, ADDITIVE MANUFACTURING AND EXPERIMENTAL ANALYSIS*	Mariana Moraes Gioia, Anderson Pereira
10:45	572	*TOPOLOGY OPTIMIZATION FIBER REINFORCED MATERIALS CONSIDERING TSAI-WU YIELD CRITERION*	Andre Luis Ferreira da Silva, Eduardo Moscatelli, Emilio Carlos Nelli Silva

ISEP, ***Session F1*** *– Room: Sala de Reuniões – MS31 (Chair: Gray Farias Moita)*

Start	***ID***	***Title***	***Authors***
11:45	462	*AN ARTIFICIAL INTELLIGENCE APPROACH FOR PREDICTING HYDROPOWER PRODUCTION IN THE NORDIC POWER MARKET*	Ali Khosravi, Ville Olkkonen, Sanna Syri
12:00	514	*ONLINE LEARNING OF DATA STREAMS: EVOLVING FUZZY PREDICTOR WITH MULTIVARIABLE GAUSSIAN PARTICIPATORY LEARNING AND RECURSIVE WEIGHTED TOTAL LEAST SQUARES*	Fernanda Pereira dos Santos Rodrigues, Alisson Marques da Silva
12:15	575	*SIGNAL POWER LOSS PREDICTION USING ARTIFICIAL INTELLI- GENCE*	LEONARDO DE OLIVEIRA CAMPOS, THABATTA MOREIRA ALVES DE ARAÚJO, EDUARDO HABIB BECHELANE MAIA, MICHEL PIRES DA SILVA, ALAN MENDES MAROTTA
12:30	640	*ACQUISITION, PROCESSING AND DATA ANALYSIS OF PIEZOELECTRIC SENSORS FOR TRAINING MUSICAL ROBOTS IN A DIDACTIC MODEL*	Alan Mendes Marotta, Emerson de Sousa Costa, Erick Nathan Martins Alves, Thiago Vinicius Andrade Abreu, Luan Carvalho Marotta, Cauan Carvalho Marotta
12:45	696	*DATABASE WITH INFORMATION ON THE ELECTRIC GRID OF THE NATIONAL INTERCONNECTED SYSTEM FOR APPLICATION IN SHORT TERM OPERATION PLANNING IN BRAZIL*	Daniel Godinho da Cruz de Almeida, Patrícia Teixeira Leite Asano, Rodrigo Alves de Moraes, Lucas Vinicius de Lima Major
13:00	809	*DATA AGGREGATOR FOR PHYSICS INFORMED NEURAL NETWORKS IN NVIDIA MODULUS FRAMEWORK*	Matheus Scramignon, Alvaro Coutinho, Marta Mattoso
13:15	919	*CERTIFICATION AND CHARACTERIZATION OF TECHNICAL PRODUCTION REGISTERED ON THE LATTES PLATFORM*	Raulivan Rodrigo da Silva, Thiago Magela Rodrigues Dias, Washington Luís Ribeiro de Carvalho Segundo

DAY 4: 16 OF NOVEMBER

*ISEP, **Plenary Sessions** – Room: Auditório Vítor Santos*

Start: 11:30

Title: **Recent advances in multiscale modelling of mechanically-induced martensitic transformation**

Speaker: Eduardo de Souza Neto [*Department of Civil Engineering, Swansea University, UK*]

Chair: Ramiro Martins

Start: 12:15

Title: **Progress in Scientific Machine Learning for Computational Mechanics**

Speaker: Alvaro Coutinho [*Professor, Civil Engineering, Coordinator of the Interdisciplinary Area of Computational Engineering and Science, The Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering, Federal University of Rio de Janeiro*]

Chair: Cláudio Horas

ISEP, ***Session G1*** *– Room: Auditório Vítor Santos – MS23 (Chair: Maria Sampaio)*

Start	ID	Title	Authors
9:00	535	*COMPARATIVE STUDY OF HOMOGENIZATION TECHNIQUES IN MASONRY*	Romildo dos Santos Escarpini Filho, Francisco Patrick Araujo Almeida
9:15	555	*FAILURE CRITERIA CHARACTERIZATION OF ORTHOTROPIC BEAMS UNDER COMBINED LOADS FOR STIFFNESS AND STRENGTH ASSESSMENT*	Eduardo Dambros Telli, Gustavo Prates Mezzomo, Joel Boaretto, Daniel Milbrath De Leon, Ignacio Iturrioz
9:30	620	*TEXTILE MODELING WITH BEAMS AND CONTACT: A BIAXIAL TENSION STUDY*	Celso Jaco Faccio Júnior, Alfredo Gay Neto, Peter Wriggers
9:45	699	*PRELIMINARY STUDIES OF HOMOGENIZATION OF NFRCM REINFORCEMENT AND REINFORCED MASONRY*	Francisco Patrick Araujo Almeida, Diogo Pereira Santos de Amorim, Romildo dos Santos Escarpini Filho
10:00	779	*COMPUTATIONAL MODELLING OF THE CRUSHING BEHAVIOUR OF PULTRUDED GLASS-FIBRE REINFORCED POLYMER STUB COLUMNS*	João Alfredo de Lazzari, José Almeida Gonilha, Nuno Silvestre, João Ramôa Correia
10:15	819	*MULTISCALE HOMOGENIZATION MODEL FOR WOOD AND THE VARIABLES INFLUENCE OVER THE MECHANICAL PROPERTIES*	Claudia M. P. Madrid, Renato Pavanello

ISEP, ***Session G1*** *– Room: Auditório Vítor Santos – MS34 (Chair: Maria Sampaio and Pedro Marques)*

Start	ID	Title	Authors
10:30	820	*INFLUENCE OF ROUGHNESS FILTERS IN THE ANALYSIS OF ELASTOHYDRODYNAMIC AND DRY CIRCULAR CONTACT*	Pedro Romio, Miguel Correia, João Marafona

ISEP, ***Session H1*** *– Room: Auditório Vítor Santos – MS14 (Chair: Roberto Dalledone MACHADO)*

Start	*ID*	*Title*	*Authors*
14:30	511	*THE INFLUENCE OF DIFFERENT PROJECTION OPERATORS IN THE VIRTUAL ELEMENT METHOD APPLIED TO BIDIMENSIONAL ELASTIC PROBLEM*	Paulo Akira Figuti Enabe, Rodrigo Provasi
14:45	684	*A STUDY OF AXISYMMETRIC STOKES FLOW USING A HYBRID-MIXED FINITE ELEMENT FORMULATION*	Giovane Avancini, Carlos Henrique Chama Puga, Philippe Remy Bernard Devloo
15:00	749	*AN ADAPTIVE GENERALIZED/EXTENDED FEM FOR LINEAR ELASTIC FRACTURE MECHANICS*	Murilo Henrique Campana Bento, Sergio Persival Baroncini Proença, Carlos Armando Duarte
15:15	777	*MODELLING VIBRATIONS OF A MODERATE AMPLITUDE IN PIEZOELECTRIC NANOPLATES USING NONLOCAL ELASTICITY AND G/XFEM*	Oscar A. G de Suarez, Tiago dos Santos, Rodrigo Rossi
15:30	784	*ANALYSIS OF THE LOCAL DOMAIN SIZE AND THE NUMBER OF ENRICHED NODES IN A GLOBAL-LOCAL GFEM APPROACH SIMULATING DAMAGE PROPAGATION IN AN L-SHAPED CONCRETE PANEL*	Anelize Borges Monteiro, Felício Brüzzi Barros, Roque Luiz da Silva Pitangueira, Samuel Silva Penna
15:45	807	*THE MODIFIED LOCAL GREEN'S FUNCTION METHOD FOR THE SOLUTION OF THE ANOMALOUS DIFFUSION EQUATION*	Ramon Macedo Corrêa, Marcos Arndt, Roberto Dalledone Machado
16:00	898	*ON THE PARAMETERS INVESTIGATION OF A NON-INTRUSIVE MULTISCALE FRAMEWORK FOR STRUCTURAL ANALYSIS.*	Neimar Aparecido da Silveira Filho, Felício Bruzzi Barros
16:15	679	*STABILITY ANALYSIS OF SHELLS USING A NURBS-BASED ISOGEOMETRIC APPROACH*	Matheus Pascoal Martins de Sousa, John Williams Ferreira de Souza, Elias Saraiva Barroso, Evandro Parente

ISEP, ***Session I1*** *– Room: Auditório Vítor Santos – MS07 (Chairs: Diogo Ribeiro and Luiz Carlos de Almeida)*

Start	*ID*	*Title*	*Authors*
17:00	718	*DYNAMIC MODEL UPDATING OF AL-AL HONEYCOMB SANDWICH PANELS FOR AEROSPACE APPLICATIONS*	Cássio Buss Mainardes, Sergio Henrique da Silva Carneiro
17:15	756	*CONTRIBUTION OF THE ECCENTRICITY OF UNBONDED TENDONS TO THE PUNCHING SHEAR RESISTANCE OF PRESTRESSED FLAT SLABS*	Elyson Andrew Pozo Liberati, Heraldo Brigo, Marília Gonçalves Marques, Leandro Mouta Trautwein
17:30	767	*STUDIES ON RAILWAY TRACK SUPPORT CONDITION ASSESSMENT USING MULTIBODY NUMERICAL MODELLING*	João Morais, Eduardo Fortunato, Diogo Ribeiro, Joaquim Mendes
17:45	791	*PARAMETRIC STRUCTURAL COMPUTATIONAL STUDY OF FLAT SLABS UNDER PUNCHING SHEAR STRESS*	Orlando Matheus de Lima Almeida, Leandro Mouta Trautwein, Thomaz Eduardo Teixeira Buttignol, Luiz Carlos de Almeida
18:00	899	*REMOTE INVENTORY AND INSPECTION OF THE TRUSS BRIDGE ELEMENTS AND CONNECTIONS USING STS AND UAV*	Piotr Olaszek, Edgar Maciejewski, Anna Rakoczy, Rafael Cabral, Ricardo Santos, Diogo Ribeiro

ISEP, ***Session G1*** *– Room: Sala de Atos – MS08 (Chairs: Eduardo M. R. Fairbairn e Miguel Azenha)*

Start	ID	Title	Authors
8:45	495	*A STUDY ON TEMPERATURE RISE IN HETEROGENEOUS CEMENT MATERIALS USING THE FE² METHOD*	Luciene de Souza Kichel, Rodrigo Rossi
9:00	539	*NUMERICAL AND ANALYTICAL STUDY OF REINFORCED CONCRETE BEAMS WITH ULTRA-HIGH PERFORMANCE FIBER REINFORCED CONCRETE (UHPFRC)*	Ingrid Rocio Irreño Palomo, Camila de Queiroz Moreira, Luiz Carlos de Almeida, Leandro Mouta Trautwein
9:15	571	*BOND BEHAVIOR BETWEEN HELICALLY WRAPPED FRP REBARS AND CONCRETE*	Cristiane Caroline Campos Lopes, Hermes Carvalho, Bruno Pedrosa, Szymon Duda, Pawel Zielonka, Michał Smolnicki, Grzegorz Lesiuk
9:30	626	*NUMERICAL INVESTIGATION OF THE PULLOUT BEHAVIOR OF STEEL FIBER-REINFORCED CONCRETE*	Marcello Congro, Deane Roehl
9:45	632	*ANALYSIS OF TRANSITION VARIABLES IN A CONTINUOUS-DISCONTINUOUS MODEL TO DESCRIBE THE CRACK PROCESS IN CONCRETE STRUCTURES*	Lívia Ramos Santos Pereira, Samuel Silva Penna
10:00	710	*ADVANCING CEMENT PASTE SHRINKAGE MODELING: INVESTIGATING THE NORMALIZED ULTRASONIC PULSE TRANSIT TIME EVOLUTION AND ITS IMPACT ON STRESS ANALYSIS IN OIL WELLS*	Carlos Pessanha Costa Carvalho, Emilio Cesar Cavalcante Melo da Silva, José Claudio de Faria Telles, Ana Beatriz de Carvalho Gonzaga e Silva, Eduardo de Moraes Rego Fairbairn, José Marcelo Silva Rocha, Magno Teixeira Mota, Ingrid Ezechiello da Silva, Romildo Dias Toledo Filho
10:15	713	*AN ALGORITHM TO COMPUTE THE PARAMETERS OF A GENERALIZED KELVIN CHAIN MODEL TO REPRESENT AGING CREEP OF CONCRETE*	Renan Rocha Ribeiro, Mara Monaliza Linhares Pereira, Valdirene Maria Silva Capuzzo, Rodrigo Lameiras, José Granja, Miguel Azenha
10:30	766	*NUMERICAL ANALYSIS OF TWO PILE CAPS REINFORCED CONCRETE WITH PARTIALLY EMBEDDED AND SHEAR KEY INTERFACE*	Rodrigo Barros, João Aurimar Correia de Morais Neto, José Neres da Silva FIlho, Daniel Nelson Maciel
10:45	844	*THERMO-CHEMO-MECHANICAL ANALYSIS OF CEMENT SHEATH BEHAVIOR: PHYSICAL SIMULATOR AND NUMERICAL MODELING*	Ana Beatriz C. G. Silva, Magno T. Mota, Carlos P. C. Carvalho, Jose Marcelo S. Rocha, Ingrid E. Silva, Jose Claudio F. Telles, Eduardo M. R. Fairbairn

ISEP, ***Session H1*** *– Room: Sala de Atos – MS08 (Chairs: Eduardo M. R. Fairbairn e Miguel Azenha)*

Start	ID	Title	Authors
14:30	894	*FINITE ELEMENT ANALYSIS ON THE CRACKING BEHAVIOR OF A STEEL-CONCRETE-STEEL (SCS) SANDWICH COMPOSITE BEAM WITH SHEAR CONNECTORS*	Igor A. Fraga, Mariane R. Rita, Ana Beatriz C. G. Silva, Eduardo M. R. Fairbairn, Jose Claudio F. Telles, Alexandre Landesmann
14:45	916	*A DISCRETE AND EXPLICIT REPRESENTATION OF TENDONS BASED ON COUPLING FINITE ELEMENTS FOR NUMERICAL ANALYSIS OF PRESTRESSED CONCRETE STRUCTURES*	Paulo V. C. N. da Gama, Osvaldo L. Manzoli, Luís A. G. Bitencourt Jr.

ISEP, ***Session H1*** *– Room: Sala de Atos – MS32 (Chair: João Paulo C. Rodrigues)*

Start	ID	Title	Authors
15:00	488	*NUMERICAL INVESTIGATION ON THE FIRE RESISTANCE OF LOAD BEARING LSF WALLS: THE EFFECT OF THE LOAD LEVEL*	Alan Vítor Devens, Paulo A. G. Piloto, Diego R. Rossetto
15:15	491	*EVALUATION OF THE CROSS-SECTION OF SUPPORT CONSTRUCTION ELEMENTS IN WOOD WITH GYPSUM SUBMITTED TO FIRE ON ONE SIDE*	Domingos A. M. Pereira, Elza M. M. Fonseca
15:30	591	*ANALYSIS OF THE FLUID DYNAMIC BEHAVIOR OF AN ENCLOSED STAIRCASE UNDER FIRE*	Alex Dalton Teixeira Alves, Gabriel Bento da Silva, Unathan Kayke de Paula
15:45	842	*BUCKLING AND POST-BUCKLING BEHAVIOR OF LIPPED-CHANNEL COLUMNS UNDERGOING DISTORTIONAL-GLOBAL INTERACTION AT ELEVATED TEMPERATURES*	Elisson Bilheiro Ferreira Filho, Alexandre Landesmann, Dinar Camotim
16:00	914	*ENERGY BALANCE FOR RESTRAINED STEEL COLUMNS IN FIRE*	Pedro Dias Simão, João Paulo C. Rodrigues
16:15	918	*NUMERICAL MODELING OF THE FIRE BEHAVIOR OF COMPOSITE STEEL AND CONCRETE JOINTS AFTER EARTHQUAKE*	Thiago Pires, João Paulo C. Rodrigues, Ruben R. Lopes

ISEP, ***Session I1*** *– Room: Sala de Atos – MS38 (Chair: Rafael Rodrigues Da Silva)*

Start	ID	Title	Authors
17:00	724	*SIMPLIFIED VEHICLE MODEL VALIDATION THROUGH TEST TRACK EXPERIMENTAL DATA - AN SUV CASE STUDY ANALYSIS*	Walter Paschoal, Igor Souza, Andre Murilo, Renan Ozelo, Rafael Silva
17:15	832	*DESIGN AND IMPLEMENTATION OF PID-BASED LONGITUDINAL AND LATERAL CONTROL FOR SMALL-SCALE VEHICLE*	João Vitor Cavalcanti Duarte, Pedro Henrique Lourenc¸o Figueiredo, Rafael Rodrigues da Silva, Evandro Leonardo Silva Teixeira, Andre Murilo Pinto, James Duvan Garcia Montoya
17:30	848	*MODELLING MR DAMPERS UNDER NON-HARMONIC EXCITATIONS THROUGH LOGISTIC CURVE MODELS*	Leonardo da Costa Rodrigues Ferreira, Marcus Vinicius Girão de Morais, Davi Matias Dutra da Silva
17:45	849	*LATERAL DYNAMIC IDENTIFICATION OF A HATCHBACK VEHICLE*	Rafael Rodrigues da Silva, Reurisson Silva Rodrigues, André Murilo, Helon Vicente Hultmann Ayala, Evandro Leonardo Silva Teixeira
18:00	881	*DEVELOPMENT OF A TEST BENCH FOR LITHIUM-ION BATTERY EVALUATION: TOWARDS HIGH-PERFORMANCE BATTERY MANAGEMENT*	Leonardo de Souza Takehana, Renato Vilela Lopes, André Murilo de Almeida Pinto, Camilo Andres Villarraga Solis, Walter Paschoal Pereira
18:15	892	*ANALYSIS OF A SEMI-ACTIVE SUSPENSION MODEL WITH AN ATTACHED INERTER DEVICE*	SUZANA MOREIRA AVILA, Polliana Cândida Oliveira Martins, Marcus Vinicius Girão de Morais

ISEP, ***Session G1*** *– Room: Sala de Reuniões – MS10 (Chair: Nelson Ebecken)*

Start	ID	Title	Authors
9:00	461	*APPLICATION OF A RELEVANCE MATRIX TO THERMAL UNIT COMMITMENT IN THE PRESENCE OF RENEWABLE ENERGY SOURCES*	Layon Mescolin de Oliveira, Ivo Chaves da Silva Junior, Ramon Abritta, Edimar José de Oliveira, Cristina Márcia Barros de Castro
9:15	603	*UTILIZATION OF ARTIFICIAL INTELLIGENCE TECHNIQUES IN THE DEVELOPMENT OF CITY INFORMATION MODELS (CIM)*	Iasmin de Sousa Jaime, Raquel Naves Blumenschein
9:30	652	*MAP FUSION FOR PRECISE YET EFFICIENT COLLABORATIVE SLAM*	Luigi Maciel Ribeiro, Nadia Nedjah, Paulo Victor R. Carvalho
9:45	675	*OPTIMIZATION OF LOAD FREQUENCY CONTROL PARAMETERS IN HYDRO-WIND SYSTEMS USING MANTA RAY FORAGING OPTIMIZATION*	Gabriel Schreider da Silva, Lucas Santiago Nepomuceno, Edimar José de Oliveira, Arthur Neves de Paula, Leonardo Willer de Oliveira, Ivo Chaves da Silva Júnior
10:00	729	*PARALLEL IMPLEMENTATION OF THE PARTICLE SWARM OPTIMIZATION ALGORITHM ON A MULTIPROCESSOR EMBEDDED SYSTEM WITH NETWORK-ON-CHIP*	Alberto de Carvalho Passos, Luiza de Macedo Mourelle, Nadia Nedjah
10:15	745	*COLLECTIVE TRANSPORT BY CAGING IN SWARM ROBOTICS*	Karen S. Cardoso, Nadia Nedjah, Luiza M. Mourelle
10:30	788	*ESTIMATING GEOMECHANICAL PARAMETERS FROM HYDRAULIC FRACTURING TESTS USING A SOFT COMPUTING-BASED METHODOLOGY*	Rafael Abreu, Cristian Mejia, Deane Roehl, Leonardo Cabral
10:45	806	*APPLICATION OF MACHINE LEARNING TECHNIQUES FOR IDENTIFYING EMERGENCY CONDITIONS IN RAINWATER GALLERIES*	Cristina Maria Ferreira da Silva, Adriano Galindo Leal, Luciana Andrea Mori Faria de Moraes, Felipe Silva Silles, Celso Luciano Alves da Silva, Vagner Luiz Gava

ISEP, ***Session H1*** *– Room: Sala de Reuniões – MS10 (Chair: Nelson Ebecken)*

Start	ID	Title	Authors
14:30	883	*AN ANN-BASED MODEL FOR PREDICTING SALINITY EFFECTS ON RELATIVE PERMEABILITY CURVES*	Vinicius Czarnobay, Angelo A. Hafner, Damianni Sebrão, Luis F. Lamas, Luiz A. Hegele Jr.
14:45	885	*ENHANCING PUBLIC TRANSPORTATION PLANNING THROUGH TRAVEL DATA ANALYSIS: A DATA MINING APPLICATION IN THE INFERENCE OF PASSENGER TRIP PURPOSE IN THE METROPOLITAN REGION OF BELO HORIZONTE, BRAZIL*	Mirian Greiner de Oliveira Pinheiro, Gray Farias Moita, Renato Guimarães Ribeiro, André Leite Guerra
15:00	891	*CREATION OF A UNIFIED CORPUS FOR AUTOMATIC DETECTION OF HATE SPEECH ON SOCIAL MEDIA*	Felipe R Oliveira, Victoria Dias Reis, Nelson F Ebecken
15:15	907	*COMPARATIVE ANALYSIS OF DESEASONALIZATION AND DETRENDING METHODS IN ENERGY CONSUMPTION FORECASTING*	Tainá de S. Coimbra, Levy Boccato, Hugo Valadares Siqueira, João Lucas F. dos Santos, Romis Attux
15:30	908	*COMPARISON OF IDENTIFICATION METHODS OF RELEVANT CLIMATE INDICES FOR STREAMFLOW FORECASTS AFFECTING A SET OF BRAZILIAN HYDROELECTRIC PLANTS*	José Fernando de Toledo, Patrícia Teixeira Leite Asano, Hugo Valadares Siqueira, Rodrigo Cesar Matheus, Roberto Asano Junior, Rodrigo Sacchi, Rodrigo Azambuja

ISEP, ***Session H1*** *– Room: Sala de Reuniões – MS30 (Chairs: Hugo Valadares Siqueira and Gerson Henrique dos Santos)*

Start	ID	Title	Authors
15:45	507	*NUMERICAL ANALYSIS OF PRESSURE GRADIENTS IN PIPING DUE TO HYDRAULIC TRANSIENTS TO DETERMINE CRITICAL AXIAL LOADS*	Rodrigo Borges Rabelo, Ivan Fabio Mota de Menezes, Luis Fernando Gonçalves Pires
16:00	588	*NUMERICAL VALIDATION OF THE IMERSPEC METHODOLOGY IN FLOW OVER JUMPS*	Julia Jorge Bastos, JESSICA LUANA DA SILVA SANTOS, Andreia Aoyagui Nascimento
16:15	593	*ENHANCING THERMAL COMFORT ANALYSIS AND OPTIMIZATION OF HVAC SYSTEMS USING OPEN-SOURCE SOFTWARE*	Júlio Modesto Beghelli, Felipe Pamplona Mariano

*ISEP, **Session I1** – Room: Sala de Reuniões – MS30 (Chairs: Hugo Valadares Siqueira and Gerson Henrique dos Santos)*

Start	ID	Title	Authors
17:00	666	*ANALYSIS OF THE EFFECTS OF SOIL THERMAL PROPERTIES ON THE PERFORMANCE OF AN EARTH-AIR HEAT EXCHANGER*	Gustavo Chaves Carraro, Carlos Henrique Diedrich, Gerson Henrique dos Santos, Victor Vaurek Dimbarre, Thiago Antonini Alves
17:15	698	*ACCURACY ASSESSMENT OF THE 2D LAMINAR BOUNDARY LAYER ON A FLAT PLATE IN AN IMMERSED BOUNDARY-FOURIER PSEUDOSPECTRAL SIMULATIONS*	Thiago Fernando Santiago de Freitas, Aristeu da Silveira Neto, Felipe Pampona Mariano
17:30	702	*COMPUTATION OF DEFORMABLE INTERFACE TWO-PHASE FLOWS: A SEMI-LAGRANGIAN FINITE ELEMENT APPROACH*	Rafael A. Vidal, Daniel B. V. Santos, Prashant Valluri, Gustavo R. Anjos
17:45	721	*ANALYSIS OF THE FLUID DYNAMIC BEHAVIOR OF THE REVERSE OSMOSIS DESALINATION PROCESS FOR DIFFERENT GEOMETRIES OF SPACERS*	Jackson de Brito Simões, Gilsomaro Barbosa de Melo Silva1, Francisco Samuel Chaves1, Diego David Silva Diniz
18:00	847	*EVALUATING THE IMPACT OF BOUNDARY CONDITIONS ON THE MR-LBM*	Marco Aurelio Ferrari, Luiz A Hegele Jr, Admilson Teixeira Franco
18:15	751	*NUMERICAL MODELING OF THE 1-D TWO-PHASE FLOW IN PIPELINES BY USING THE TWO-FLUID MODEL AND A VERY HIGH ORDER (VHO) FLUX RECONSTRUCTION (FR) SCHEME*	Anderson Viana do Nascimento, Darlan Karlo Elisiário de Carvalho, Giselle Maria Lopes Leite da Silva, Paulo Roberto Maciel Lyra, Alessandro Romário Echevarria Antunes