Machine Learning and Data-Driven Approaches in Railway Dynamics

ARALIYA MOSLEH[1], DIOGO RIBEIRO[2], JOSEF FINK [3], ANDREAS STOLLWITZER[4], ANNEMIEKE MEGHOE[5]

[1] CONSTRUCT—LESE, Faculty of Engineering, University of Porto,
R. Dr. Roberto Frias, 4200-465 Porto, Portugal,
amosleh@fe.up.pt, https://www.linkedin.com/in/araliyamosleh56491a50/?originalSubdomain=pt

[2] School of Engineering – Polytechnic of Porto
Rua Dr. António Bernardino de Almeida, 431, 4249-015 Porto, Portugal
drr@isep.ipp.pt, https://www.linkedin.com/in/diogo-ribeiro-33712642/

[3] Institute of Structural Engineering – Research Unit Steel Structures, TU Wien
Karlsplatz 13, 1040 Vienna, Austria
josef.fink@tuwien.ac.at
[4] Institute of Structural Engineering – Research Unit Steel Structures, TU Wien
Karlsplatz 13, 1040 Vienna, Austria
andreas.stollwitzer@tuwien.ac.at

[5] MS3 – Dynamics Based Maintenance, Faculty of Engineering Technology, University of Twente
Drienerlolaan 5, 7522 NB Enschede, Netherlands
a.a.meghoe@utwente.nl, https://people.utwente.nl/a.a.meghoe

ABSTRACT

In 2019, "The European Green Deal" set an ambitious target to make Europe the first climate-neutral continent by 2050. A vital aspect of this transition is the development of sustainable and smart mobility systems, with a specific focus on railway transport [1]. This symposium aims to promote the use of advanced techniques in numerical analyses and experimental field tests to improve railway safety, efficiency, and resilience. By bringing together experts from academia and industry, the symposium will facilitate knowledge exchange, foster collaborations, and encourage the development of adaptive infrastructure systems to achieve the goals set forth by "The European Green Deal". The proposed symposium has the following objectives: i) explore innovative approaches and technologies for enhancing railway safety, efficiency, and resilience; ii) facilitate collaboration and partnership opportunities among researchers, practitioners and industry experts; iii) discuss strategies to address the challenges associated with increasing rail capacity high-speed rail lines and maintenance costs; iv) showcase successful case studies and best practices in railway infrastructure development and management; v) identify future research directions and potential policy interventions to support sustainable and resilient railway systems.

Key words: wayside/drive-by condition monitoring, machine learning, bridge dynamics, vehicle-bridge interaction, track-bridge interaction, predictive maintenance, data science, prognostic models, data-driven approach, damage identification, computer vision and image analysis, smart mobility

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