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PHYSICS-INFORMED AND AUGMENTED LEARNING IN THE MECHANICS OF MATERIALS

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ABSTRACT

Plenty of effort has been dedicated throughout history to create very accurate models. As an example, the reader may think about all different models formulated, for instance, in plasticity.

However, we also know that no model is perfect: it is always subjected to certain limiting hypothesis, experimental noise, etc. Indeed, even if you could calibrate a model perfectly well, no guarantee is given that for another set of experiments, different from the calibration ones, the model is going to provide you a perfect result.

It has been argued that constitutive models are of a lower epistemic level than other, more fundamental, equations. This last group includes equilibrium and compatibility, for instance. This reasoning is at the origin of the so-called data-driven computational mechanics approach. These approaches can be embedded in an even more general context. Several works have been devoted to unveil governing equations from data. These may include laws in the form of partial differential equations, for instance.

The main aim of this symposium is to investigate hybrid routes by enhancing or correcting existing, well-known, models with information coming from data, while also exploring the different ways in which existing models could help us in finding the best ways to obtain data.