COUPLED-PHYSICS-INFORMED MACHINE LEARNING

ALBERTO BADÍAS[*], FRANCISCO CHINESTA[†] AND ELÍAS CUETO[‡]

[*] Polytechnic University of Madrid
Madrid, Spain
Alberto.badias@upm.es

[†] ESI Group Chair, ENSAM Institute of Technology
Paris, France
Francisco.Chinesta@ensam.eu

[‡] Aragon Institute of Engineering Research
Universidad de Zaragoza
Zaragoza, Spain
ecueto@unizar.es

ABSTRACT

In the last few years a growing interest has been detected in the development of physics-informed machine learning methods. These are methods in which the learning process is guided, or constrained (or biased) by the imposition of known laws of physics.

In this mini-symposium we will address the development of such techniques for the analysis of coupled phenomena. Physics-informed neural networks, structure-preserving neural networks or thermodynamics-informed neural networks are particular examples of such techniques. However, the minisymposium is by no means limited to these, and contributions will be welcome from any other related field. Methods based on the use of neural networks will be considered, but also methods based on more classical regression techniques, manifold learning or any other machine learning methodology.

Of particular interest is the analysis of learning procedures for physical phenomena with dependence on history, the effective discovery of internal variables, etc.