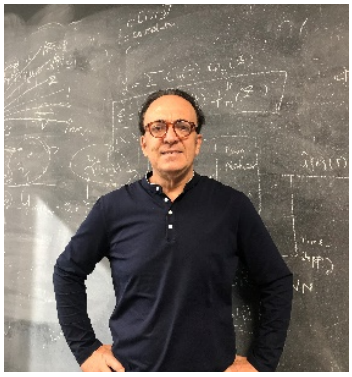
Ε Θ Ν Ι Κ Ο Μ Ε Τ Σ Ο Β Ι Ο Π Ο Λ Υ Τ Ε Χ Ν Ε Ι Ο

Ο Πρύτανης του Εθνικού Μετσόβιου Πολυτεχνείου, Ανδρέας Γ. Μπουντουβής, σας προσκαλεί να παρακολουθήσετε την ακόλουθη ομιλία που διοργανώνεται με πρωτοβουλία του Εργαστηρίου Στατικής και Αντισεισμικών Ερευνών της Σχολής Πολιτικών Μηχανικών του ΕΜΠ.

Διαδικτυακή ομιλία – Webinar

From Neural PDEs to Neural Operators: Blending data and physics for fast predictions



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Τρίτη, 10 Μαΐου 2022, 5.00 μμ

Webex Webinar: https://centralntua.webex.com/centralntua/j.php?MTID=mc9e71b5824c4ed7da4557d03a0f3ac57
NTUA youtube channel: https://www.youtube.com/channel/UC-L-24Fk5qakf_TxDadKH8g (live)

Abstract: We will review physics-informed neural network and summarize available extensions for applications in computational mechanics and beyond. We will also introduce new NNs that learn functionals and nonlinear operators from functions and corresponding responses for system identification. The universal approximation theorem of operators is suggestive of the potential of NNs in learning from scattered data any continuous operator or complex system. We first generalize the theorem to deep neural networks, and subsequently we apply it to design a new composite NN with small generalization error, the deep operator network (DeepONet), consisting of a NN for encoding the discrete input function space (branch net) and another NN for encoding the domain of the output functions (trunk net). We demonstrate that DeepONet can learn various explicit operators, e.g., integrals, Laplace transforms and fractional Laplacians, as well as implicit operators that represent deterministic and stochastic differential equations. More generally, DeepOnet can learn multiscale operators spanning across many scales and trained by diverse sources of data simultaneously.