



PhD program in Engineering and Applied Sciences

Doctoral Short-Course (4 h)

Inverse Analysis: Structural Optimisation and Parameter Identification

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Tuesday, July 26, 2022, 9:00 - 13:00 (CET)

Registration form

<https://bit.ly/3beK0se>



Room B002

Università degli studi
di Bergamo (Dalmine)

<https://bit.ly/3QMVWla>



Microsoft Teams link

<https://bit.ly/3N79eWW>



The scope of this Doctoral Short-Course is to provide an introduction to inverse analysis, in the context of material parameter identification. Focus will be on: (i) theoretical background and framing; (ii) algorithmic techniques; (iii) applications. It will be shown how to combine experimental data and numerical procedures with mathematical programming, toward building a practical procedure for the assessment of unknown material parameters. Such analyses generally involve recursive simulations; hence, an introduction to Reduced-Order models to expedite nonlinear simulations will be provided. Aspects of numerical implementation will be discussed, then followed by practical examples.

Timeline

- 9:00 – 10:00 Introduction: Inverse Analysis methodology
- 10:00 – 11:00 Algorithms of numerical optimisation
- 11:00 – 12:00 Proper Orthogonal Decomposition for efficient simulations
- 12:00 – 13:00 Numerical implementations and applications

Suggested readings

- [1] V. Buljak. *Inverse Analyses with Model Reduction: Proper Orthogonal Decomposition in Structural Mechanics*. Springer, New York, 2012.
- [2] R. Fletcher. *Practical Methods of Optimization*, 2nd ed. John Wiley & Sons, Chichester, 2000.
- [3] J. Nocedal, S.J. Wright. *Numerical Optimization*. Springer, New York, 2006.

Vladimir Buljak is professor at the Department of Strength of Materials, Mechanical Engineering Faculty, University of Belgrade. He has been visiting professor at DICA Department of Politecnico di Milano since 2015, teaching a course of Theory of Plasticity in Master programmes. He has been the scientist in charge for several international and national projects, dealing with material constitutive modelling and characterisation. He is currently project coordinator for the University of Belgrade within European project Horizon 2020-ITN-EDD RE-FRACTURE2, dealing with characterisation of refractory materials.

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