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PhD Course:

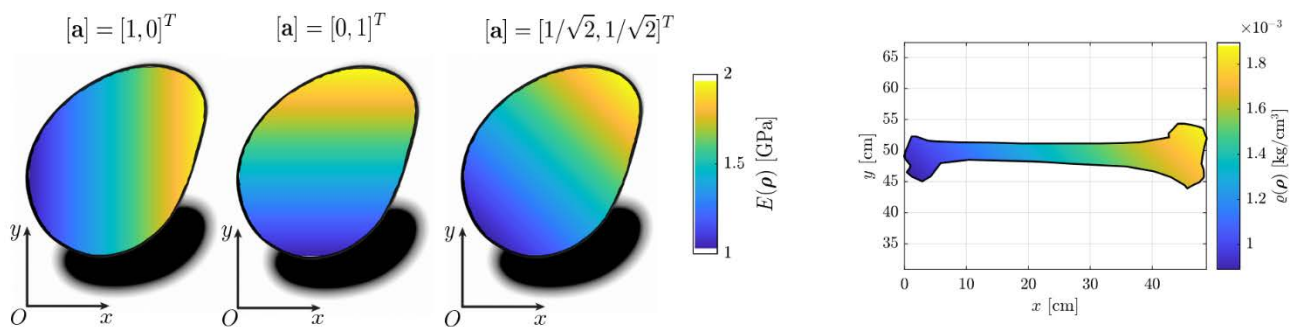
Elastic Moments of Area for Functionally Graded 2D and Axisymmetric Domains

Luciano Rosati and Davide Pellecchia

Language: **English**

16 hours of frontal teaching

CFU: 2



Davide Pellecchia, Nicolò Vaiana, Salvatore Sessa, & Anna Castellano (2024). Mass moments of functionally graded 2D domains and axisymmetric solids. *Applied Mathematical Modelling*, 129, 250-274.

A Functionally Graded Material (FGM) refers to a material whose composition and structure gradually change throughout its volume, resulting in varying material properties that serve specific functions. The properties of an FGM depend on its spatial position within the structure. It is important to note that traditional Solid Mechanics equations assume the use of homogeneous materials with uniform properties, so extensive research has been conducted to address the challenges posed by FGMs.

In this course, a general methodology for computing the elastic moments of FG 2D and axisymmetric domains having arbitrary shape is shown. As a result, the main objective of the course is to introduce a practical approach, computationally more effective than Gauss quadrature method, to accurately assessing the geometric properties of such domains characterised by complex distributions of density and Young's modulus.



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Course program:

February 10th 2025 10:00 – 12:00 13:00 – 15:00	Vector and tensor algebra, differentiation of tensor fields
February 11th 2025 10:30 – 14:30	Derivation and implementation of elastic moments of area for homogeneous polygonal cross sections
February 12th 2025 10:00 – 12:00 13:00 – 15:00	Derivation and implementation of elastic moments of area for functionally graded polygonal 2D domains and axisymmetric domains
February 13th 2025 9:30 – 13:30	Closing remarks and classwork

Registration:

Ph.D. students who are interested in attending the short course are invited to send an e-mail by February 5th to:

davide.pellecchia@unina.it