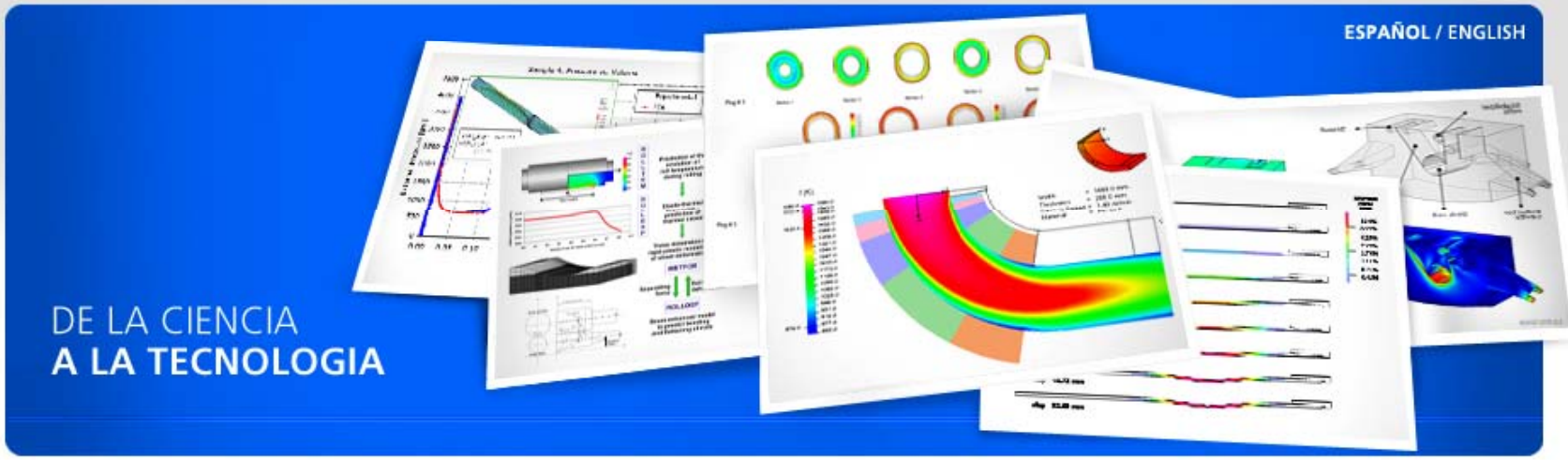
SIM&TEC

Simulación y Tecnología

Simulation and Technology



Advanced Topics in Computational Solid Mechanics Industrial Applications

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Objectives

The course objective is to discuss the use of computational simulation methods for analyzing and optimizing production processes and for developing new products.

Course topics

Topic	Section #
Introduction	1
Kinematics of the continuous media	2
Stress measures	3
The Principle of Virtual Work. Linear formulation and incremental formulation for nonlinear analyses	4
Constitutive relations.	5
FEM review: linear and nonlinear problems	6
Modeling of bulk metal forming processes. The flow formulation. Industrial applications.	7
General nonlinear shell elements.	8
Tracking nonlinear equilibrium paths: the Riks method	9
Modeling of steel pipes collapse: industrial examples	10

Some references

- Malvern L. (1969), *Introduction to the mechanics of a continuous medium*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey.
- Marsden J.E. and Hughes T.J.R. (1983), *Mathematical Foundations of Elasticity*, Dover.
- Dvorkin E.N. and Goldschmit M.B. (2005), *Nonlinear Continua*, Springer, Berlin.
- Simo J.C. and Hughes T.J.R. (1998), *Computational Inelasticity*, Springer, N.Y.
- Bathe K.J. (1996), *Finite Element Procedures*, Prentice Hall, Upper Saddle River, NJ.
- Zienkiewicz O.C. and Taylor R.L. (1989), The Finite Element Method, McGraw-Hill.