

Nonlinear Continuum Mechanics

An introduction to finite deformation continuum mechanics and nonlinear material behavior. Coverage of basic tensor- manipulations and calculus, descriptions of kinematics, and balance laws for momentum, energy, and entropy. Discussion of invariance principles and material response functions for elastic, inelastic, and coupled field phenomena.

Week	Lecture Topics
1	Tensors: algebra, as linear operators
2	Tensors: calculus
3	Kinematics: motion, gradient, polar decomposition
4	Kinematics: strain
5	Kinematics: rates
6	Global Balance: mass, momentum, energy, entropy
7	Stress: Cauchy's theorem
8	Stress: alternative measures
9	Invariance: observer
10	Material Response: elasticity
11	Material Response: elasticity
12	Material Response: visco-elasticity
13	Material Response: thermo-elasticity