

ASEN 5519 Special Course (Fall 2004): Topics in Multiphysics Modeling

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Class Schedule: TTh 2:00-3:15 p.m., ASEN Vision Lab
Class Notes: To be provided including some relevant journal articles.

Course Outline

I. Variational Formulation for Couple-Field Problems

Variational formulations, construction of coupling procedures, interface frames, Lagrange multipliers.

II. Models for Interaction Problems

Physical single-field models (structure, fluid, thermal, electrodynamics, etc.), interdisciplinary problems, interaction modeling examples.

III. Computational Algorithms for Interaction Problems

Treatment of interactions terms, stabilization, partitioned analysis, heterogeneity regularization.

IV. Contact Problems as Interaction Problems

Contact Interface formulation, slip and frame displacement, contact patch test.

V. Eulerian and Lagrangian Interface Treatments

Particle hydrodynamics code, transition algorithms, level set, geometric conservation laws.

VI. Thermal-Structure-Active Elements

Coupling between structural and thermal fields, illustrative examples, one-way and two-way couplings.

VII. Description of Term Projects

Several term projects will be described depending on students' interest and/or ongoing project.

Course Grading: 4 Homework Assignments (40%), One-Midterm Exam (20 %), Term Project (40 %)