Computational Combustion

Stephen B. Pope & Zhuyin Ren

Cornell University

Ithaca, New York

The projects below were developed as part of the graduate course MAE643 Computational Combustion taught at Cornell in 2004 and 2006. In each project, the student is led through a computational exercise which both provides instruction in the use of the software and also provides insights into the physics and chemistry involved. The focus of the projects is on: the thermochemistry and kinetics of ideal gas mixtures; laminar premixed and nonpremixed flames; and turbulent non-premixed flames. The software used is Chemkin IV (for laminar flames) and Fluent (for turbulent flames).

These projects may be used by instructors in similar courses, or by students for independent study.

- **Project 1: Thermochemistry** (Download Project 1 files)
- **Project 2: Chemical kinetics** (Download Project 2 files)
- **Project 3: Premixed laminar flames** (Download Project 3 files)
- **Project 4: Nonpremixed laminar flames** (Download Project 4 files)
- **Project 5: Turbulence modeling of jet flames** (Download Project 5 files)
- **Project 6: Simple models of non-premixed jet flames PR6.zip** (Download Project 6 files)
- **Project 7: Transported PDF methods** (Download Project 7 files)

Supporting material may be found at the MAE643 website.

This material is based upon work supported by the National Science Foundation under Grant No. CBET-0426787 .

All content on this website is licensed under a Creative Commons License.