

GEO 5500 Numerical Methods in the Geosciences
Computer Assignment #1:
Introduction to Matlab and the Philosophy of Models

Assigned: January 12, 2005

Due: January 19, 2005

The procedure for this (and all other) assignments will be to submit your Matlab code and any documentation to Derrick via e-mail .

Reading: Lindfield and Penny, Chapter 1.

Oreskes, N., Shrader-Frechette, K., and Belitz, K., Verification, validation, and confirmation of numerical models in the earth sciences: *Science*, v. 263, p. 641-646 (on reserve in WBB 719)

1. Write a Matlab m-file that progressively solves the series for an exponential:

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

Compare your results with the Matlab "exp" function using an interesting value of x. You should produce a plot that shows both the series results in terms of progressively higher terms and as the output from "exp" function.

2. Write a short paragraph about the Oreskes et al., article that briefly explains the difference between verification, validation, confirmation, and calibration of numerical models. Do you agree or disagree with the basic premise of the authors? How do their arguments relate to current public policy debates such as the use of models to predict the increase of carbon dioxide in the atmosphere? (Feel free to comment on any firsthand experience you have had with models).