Quantitative Macroeconomic Theory

Problem set 1

You can do this homework in Excel(tm). If you want to do it in Matlab(tm) or another programming language come and see me if you need help getting started. This page has a good set of "Links to matlab tutorials" (scroll down).

Approximate the function

$$f(x) = \frac{1}{1+x^2} \tag{1}$$

over the interval $[-5, 5]$ using 5 and 9 points.

1. Use
   - the monomial basis $\{1, x, \cdots, x^j\}$ with both equidistant and Chebyshev nodes;
   - the Chebyshev polynomial basis with both equidistant and Chebyshev nodes.
2. For each of the cases evaluate the accuracy of your approximation in the following way. Compute the absolute error (the absolute value of the difference between the approximation and the true function) at 201 equidistant points (i.e. the set of points $\{-5, -4.95, -4.9, \cdots, 4.9, 4.95, 5\}$. Use the average absolute error and the maximum absolute error over all points as your accuracy criteria.