

MATH 465/565

Homework for 8.3

465/565

1. Use Matlab to interpolate $f(x) = \frac{1}{20x^2 + 1}$ on $[-1, 1]$ in the following 9 ways.

- (a) Use three, five and nine equally spaced points.
- (b) Use the roots of the third, fifth and ninth Legendre polynomials.
- (c) Use the roots of the third, fifth and ninth Chebyshev polynomials.

For each of (a)-(c) create one table with four columns: x and relative error for each of the three grid spacings. In addition, create one plot for each of (a)-(c) which contains $f(x)$ and the three interpolating polynomials. Discuss the accuracy of the different interpolations. Which perform best? Why?