Math 707, **Homework Set 3**, SPRING 2002

Consider the 2π-periodic function $u(x) = e^{\sin 2x}$. Compare the convergence rates obtained when computing the first derivative, u_x, by second-order accurate central differences and by pseudo-spectral differentiation. Do so by graphing the maximum error in $[0, 2\pi]$ obtained with $N = 8,\ 16,\ 32, ..., 1024$ versus N. Discuss the accuracy obtained with the two methods, and the behavior of the error with increasing N for each method.