Math 640B **Winter 2004**

Homework 4, due Friday 6 February.

1. (10 points) Section 6.7 problem 8.

2. (30 points)
   Consider the vectors $w = (2, 2, 3)$, $v_1 = (1, 1, 0)$, and $v_2 = (0, 1, 1)$.

   (a) Find the coefficients α_1 and α_2 to give the best least squares approximation
   $$w \approx \alpha_1 v_1 + \alpha_2 v_2.$$

   (b) From v_1 and v_2 construct orthogonal vectors u_1 and u_2 and find the coefficients β_1 and β_2 to give the best least squares approximation
   $$w \approx \beta_1 u_1 + \beta_2 u_2.$$

   (c) Explain why these two methods do (or do not) give the same approximation to w. How do they relate to the least-squares problems in Section 5.3?

3. (15 points) Section 6.8 problem 8.

4. (30 points) Section 6.9 problem 2.
   Do this problem as a Good Problem, paying particular attention to the *Intros* handout.

5. (15 points) Section 6.9 problem 13.