18.06 Problem Set 9

Due **TUESDAY**, Nov. 21, 2006 at **4:00 p.m.** in 2-106

Problem 1 *Monday 11/13*

Do Problem #10 from section 6.3 in your book. (For (a), just explain in your own words: Why is u's length constant? And why is that constant the length of $u(0)$?)

Problem 2 *Wednesday 11/15*

Do Problem #11 from section 6.4 in your book. (Answer in back, but try it yourself first.)

Problem 3 *Wednesday 11/15*

Do Problem #18 from section 6.4 in your book.
Then show the converse: if A has a complete set of orthonormal eigenvectors with real eigenvalues, then it must be symmetric. *(Hint: diagonalize.)*

Problem 4 *Wednesday 11/15*

Do Problem #27 from section 6.4 in your book.

Problem 5 *Friday 11/17*

Do Problem #7 from section 6.5 in your book.
Use all four tests for each of these: find the pivots, the eigenvalues, the upper-left determinants, and the "quadratic form" $x^{\mathrm{T}}Mx$.

Problem 6 *Friday 11/17*

Do Problem #20 from section 6.5 in your book.

Problem 7 *Friday 11/17*

Do Problem #28 from section 6.5 in your book.
Then sketch the ellipse $x^{\mathrm{T}}Ax = 1$ for $\theta = \pi/4$. Draw in the eigenvectors.