Math 544 Apr 5, 2001
Linear Algebra
Spring 2001, USC

QUIZ 8

Time: 10min

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1. Use elementary row operations to find the determinant of the following *Vandermonde* matrix:

$$A = \begin{bmatrix} 1 & x_1 & (x_1)^2 \\ 1 & x_2 & (x_2)^2 \\ 1 & x_3 & (x_3)^2 \end{bmatrix}.$$

2. Prove that given 3 points (x_1, y_1), (x_2, y_2), and (x_3, y_3) in $\mathbf{R}^2$, with x_1, x_2 and x_3 all distinct, there exists a second order polynomial $p(x) = ax^2 + bx + c$ such that $y_1 = p(x_1)$, $y_2 = p(x_2)$ and $y_3 = p(x_3)$.

Hints: follow these steps:

(i) Write a system of three linear equations.

(ii) Put the system in the matrix notation.

(iii) Observe that the coefficient matrix is in the Vandermonde form.

(iv) What can you conclude from that? Why?

Problem 1 is worth 7 *points and Problem* 2 *is worth* 8 *points.*