MTH 42 LECTURE NOTES (Ojakian)

Topic 14: Determinant

OUTLINE

(References: 5.1)

1. Computing the Determinant

2. Connection to inverse

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1. <u>Determinant - Informal Introduction</u>

   (a) Minors

   PROBLEM 1. *Choose any 4 by 4 matrix and find some of its minors.*

   (b) First Examples

   PROBLEM 2. *Choose any 2 by 2 matrix and find its determinant.*

   PROBLEM 3. *Do excercise 12 from Section 5.1 (page 191).*

   (c) Cofactors

   PROBLEM 4. *For the last problem, find some cofactors.*

2. <u>Determinant - Recursive Definition</u>

   (a) Det([a]) = a (i.e. for 1 by 1 matrix)

   (b) Det(A) = $a_{11}C_{11} + a_{12}C_{12} + \ldots + a_{1n}C_{1n}$

   PROBLEM 5. *Do excercise 13 from Section 5.1 (page 191).*

   (c) Can "expand" along any row or column to compute the determinant.

   PROBLEM 6. *Redo one of excercise 12 or 13 from Section 5.1 (page 191). But now expand using a different row or column.*

3. <u>Some properties of determinant</u>

   (a)

   PROBLEM 7. *Compute Det(I).*

   (b) See Theorem 5.6

   (c) See Theorem 5.12

   PROBLEM 8. *Prove that if either matrix A or B is not invertible, then neither is AB (use the determinant).*