MATH 2418

Exam 2 Reviews

2.6

Elimination = Factorization: A = LU

**Book**

Chapter main points

1. Each elimination step Eij is inverted by Lij. Off the main diagonal change –lij to +lij
2. The whole forward elimination process (with no row exchanges) is inverted by L:
   1. L = (L21L31…LN1)(L32..LN2)(L43..LN3)…[LN(N-1)]
3. That product matrix L is still lower triangular. Every multipler lij is in row i and column j.
4. The original A is recovered from U by A = LU = (lower triangular)(upper triangular)
5. Elimination on Ax = b reached U x = c. Then back substitution solves Ux = c.
6. Solving a triangular system takes n^2 / 2 mutiply subtracts. Elimination to find U takes n^3/ 3.

Facts

(E32E31E21) A = U **--->** (E21-1E31-1E32-1) A = U **--->** A = LU

Rules

**Class**

**Recitation**