Linear equation systems: exact methods

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Numerical Methods,
10 October, 2016

Linear eq. system

⇛ This and the next lecture will focus on a well known problem. Solve the following equation system:

$$A \cdot x = b,$$

⇛ $A = a_{ij} \in \mathbb{R}^{n \times n}$ and $\det(A) \neq 0$
⇛ $b = b_i \in \mathbb{R}^n$.
⇛ The problem: Find the x vector.

Error digression

$\Rrightarrow$ There is enormous amount of ways to solve the linear equation system.
$\Rrightarrow$ The choice of one over the other of them should be gathered by the *condition* of the matrix A denoted at $cond(A)$. $\Rrightarrow$ If the $cond(A)$ is small we say that the problem is well conditioned, otherwise we say it's ill conditioned.
$\Rrightarrow$ The *condition* relation is defined as:

$$cond(A) = \|A\| \cdot \|A^{-1}\|$$

$\Rrightarrow$ Now there are many definitions of different norms... The most popular one (so-called "column norm"):

$$\|A|_1 = \max_{1 \leqslant j \leqslant n} \sum_{i=1}^{n} |a_{i,j}|,$$

where n -is the dimension of A, i, j are columns and rows numbers.

Backup