

Triangular linear systems

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$$\left\{ \begin{array}{lcl} a_{11}x_1 + a_{12}x_2 + a_{13}x_3 + \cdots & \cdots + & a_{1n}x_n = b_1 \\ & a_{22}x_2 + a_{23}x_3 + \cdots & \cdots + a_{2n}x_n = b_2 \\ & a_{33}x_3 + \cdots & + a_{3n}x_n = b_3 \\ & \ddots & \vdots \\ & a_{ii}x_i + a_{i,i+1}x_{i+1} + & \cdots + a_{in}x_n = b_i \\ & \ddots & \vdots \\ & & a_{n-1,n-1}x_{n-1} + a_{n-1,n}x_n = b_{n-1} \\ & & a_{nn}x_n = b_n \end{array} \right.$$

The solution x is obtained by *backward-substitution* (we find x_n, \dots, x_1 from bottom to top).

In the dual situation, when we find the solution from top to bottom, we have the *forward-substitution*.