# 解下三角

$$
\begin{aligned}
a_{11}x_1 &= b_1 \\
a_{21}x_1 + a_{22}x_2 &= b_2 \\
&\vdots \\
a_{n1}x_1 + a_{n2}x_2 + \cdots + a_{nn}x_n &= b_n
\end{aligned}
\qquad
A = \begin{bmatrix} a_{11} & & \\ a_{21} & a_{22} & \\ & & \\ a_{n1} & a_{n2} & \cdots a_{nn} \end{bmatrix}
$$

要求： $a_{ii} \neq 0 \quad (i = 1, 2, \cdots, n)$

解法：

① $x_1 = \dfrac{b_1}{a_{11}}$

② $x_k = \dfrac{b_k - a_{k1}x_1 - a_{k2}x_2 - \cdots - a_{k,k-1}x_{k-1}}{a_{kk}} \qquad (k = 2, 3, \cdots, n)$

算法：

Input : A, b

Output : x

① $x_1 = \dfrac{b_1}{a_{11}}$

② for $k = [2, 3, \cdots, n]$

$$x_k = \frac{b_k - a_{k1}x_1 - a_{k2}x_2 - \cdots a_{k,k-1}x_{k-1}}{a_{kk}}$$

end

get $x = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}$

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