

### 第 08 周作业

练习 1. 求矩阵  $A = \begin{pmatrix} 1 & -1 & 2 & 1 & 0 \\ 2 & -2 & 4 & 2 & 0 \\ 3 & 0 & 6 & -1 & 1 \\ 4 & -1 & 8 & 4 & 1 \end{pmatrix}$  的秩。

练习 2. 设  $A = \begin{pmatrix} 1 & -1 & 2 & 3 \\ -1 & a & 2 & -1 \\ 3 & 1 & b & 5 \end{pmatrix}$ 。对参数  $(a, b)$  的每种取值, 求出相应的秩  $r(A)$ 。

练习 3. 求解线性方程组 
$$\begin{cases} x_1 + 2x_2 + x_3 + x_4 + x_5 = 1 \\ 2x_1 + 4x_2 + 3x_3 + x_4 + x_5 = 3 \\ -x_1 - 2x_2 + x_3 + 3x_4 - 3x_5 = 7 \\ 2x_3 + 5x_4 - 2x_5 = 9 \end{cases}$$
 的通解。

练习 4. 《九章算术》卷八为“方程”，试解其中第八题：

今有賣牛二羊五以買一十三豕有餘錢一千賣牛三  
豕三以買九羊錢適足賣六羊八豕以買五牛錢不足  
六百問牛羊豕價各幾何

**练习 5.** In a grid of wires, the temperature at exterior mesh points is maintained at constant values (in  $^{\circ}C$ ), as shown in the accompanying figure. When the grid is in thermal equilibrium, the temperature  $T$  at each interior mesh point is the average of the temperatures at the four adjacent points. For example,

$$T_2 = \frac{T_3 + T_1 + 200 + 0}{4}.$$

Find the temperatures  $T_1$ ,  $T_2$  and  $T_3$  when the grid is in thermal equilibrium.

