ASTE 404
Quiz 3
Nikita Persikov

Problem 1: (see attached handwritten work)

Problem 2:

a) Singular (see attached handwritten work)
b) Identity
c) Non-Square
d) Dense
f) Diagonally-Dominant
g) Banded
h) Sparse
I) Symmetric

Problem 3: **True**

Problem 4: **False**

Problem 5: **False**

Problem 6: **True**

Problem 7: **Successive Over Relaxation**

Problem 8: **Elliptic**

АЯТЕМОЧ Quiz 3 Nikita Pecritov

P1:

$$\left.\begin{aligned} x_1 - x_2 &= y_0 \\ -2x_2 + x_1 &= 14 \\ x_2 &= 0 \end{aligned}\right\} \Rightarrow \left.\begin{aligned} x_1 - x_2 - y_0 &= 0 \\ x_1 - 2x_2 + 0y_0 &= 14 \\ 0x_1 + x_2 + 0y_0 &= 0 \end{aligned}\right\}$$

$$\Rightarrow \boxed{\begin{bmatrix} 1 & -1 & -1 \\ 1 & -2 & 0 \\ 0 & 1 & 0 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ y_0 \end{bmatrix} = \begin{bmatrix} 0 \\ 14 \\ 0 \end{bmatrix}}$$

P2:

$$\begin{bmatrix} 1 & -2 & 1 \\ 1 & 1 & 0 \\ 2 & -4 & 2 \end{bmatrix}; \quad D = 1(2-(-4)) - (-2)(2-2) + 1(-4-2)$$

$$= 6 + \cancel{2(0)}^{0} + (-6) = 0; \quad D = 0$$

$\Rightarrow$ matrix a) is singular!