

Optimizing Methods

Nine List of Problems

1. By using definition check if given below matrices are *positively (negatively) defined*

$$I_n \text{ (the identity matrix with rank } n), \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}, \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}.$$

2. For the matrices given in the task 1, write the *characteristic polynomial* $W(\lambda) = \det(A - \lambda I)$.
3. For the matrices given in the task 1, find the set of all *eigenvalues* and the set of all *eigenvectors* of A .
4. Based on the results obtained in the last task, to decide whether the matrix A is positively (negatively) defined.