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NUMERYCZNA ALGEBRA LINIOWA

Metody iteracyjne

$$\begin{bmatrix} 4 & -1 & -0.2 & 2 \\ -1 & 5 & 0 & -2 \\ 0.2 & 1 & 10 & -1 \\ 0 & -2 & -1 & 4 \end{bmatrix} \cdot \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 30 \\ 0 \\ -10 \\ 5 \end{bmatrix}, \quad x_0 = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \quad x = \begin{bmatrix} 6.9616 \\ 2.2211 \\ -1.1541 \\ 2.0720 \end{bmatrix}$$

Metoda Jacobiego

$$x^{(1)} = \begin{bmatrix} 7.5 \\ 0 \\ -1 \\ 1.25 \end{bmatrix}, x^{(2)} = \begin{bmatrix} 6.825 \\ 2 \\ -1.025 \\ 1 \end{bmatrix}, x^{(3)} = \begin{bmatrix} 7.4488 \\ 1.7650 \\ -1.2365 \\ 1.9937 \end{bmatrix}, x^{(4)} = \begin{bmatrix} 6.8826 \\ 2.2873 \\ -1.1261 \\ 1.8234 \end{bmatrix}, x^{(5)} = \begin{bmatrix} 7.1038 \\ 2.1059 \\ -1.1840 \\ 2.1121 \end{bmatrix}$$

Metoda Gaussa-Seidela

$$x^{(1)} = \begin{bmatrix} 7.5 \\ 1.5 \\ -1.3 \\ 1.675 \end{bmatrix}, x^{(2)} = \begin{bmatrix} 6.9725 \\ 2.0645 \\ -1.1784 \\ 1.9876 \end{bmatrix}, x^{(3)} = \begin{bmatrix} 6.9634 \\ 2.1817 \\ -1.1593 \\ 2.0540 \end{bmatrix}, x^{(4)} = \begin{bmatrix} 6.9619 \\ 2.2140 \\ -1.1552 \\ 2.0682 \end{bmatrix}, x^{(5)} = \begin{bmatrix} 6.9616 \\ 2.2196 \\ -1.1544 \\ 2.0712 \end{bmatrix}$$

Metoda SOR(ω)

$$x^{(1)} = \begin{bmatrix} 9.4471 \\ 2.3799 \\ -1.7974 \\ 2.5074 \end{bmatrix}, x^{(2)} = \begin{bmatrix} 6.0516 \\ 2.1700 \\ -0.9029 \\ 2.0059 \end{bmatrix}, x^{(3)} = \begin{bmatrix} 7.2392 \\ 2.2710 \\ -1.2410 \\ 2.0933 \end{bmatrix}, x^{(4)} = \begin{bmatrix} 6.8863 \\ 2.1999 \\ -1.1244 \\ 2.0625 \end{bmatrix}, x^{(5)} = \begin{bmatrix} 6.9823 \\ 2.2271 \\ -1.1643 \\ 2.0750 \end{bmatrix}$$

Metoda najszybszego spadku

$$x^{(1)} = \begin{bmatrix} 6.0294 \\ 0 \\ -2.0098 \\ 1.0049 \end{bmatrix}, x^{(2)} = \begin{bmatrix} 6.4572 \\ 0.9910 \\ -0.7898 \\ 0.8780 \end{bmatrix}, x^{(3)} = \begin{bmatrix} 7.0694 \\ 1.6051 \\ -1.4507 \\ 1.3831 \end{bmatrix}, x^{(4)} = \begin{bmatrix} 7.1071 \\ 1.8571 \\ -1.0509 \\ 1.5540 \end{bmatrix}, x^{(5)} = \begin{bmatrix} 7.1271 \\ 2.0249 \\ -1.2703 \\ 1.8153 \end{bmatrix}$$

Metoda sprzężonych gradientów

$$x^{(1)} = \begin{bmatrix} 6.0294 \\ 0 \\ -2.0098 \\ 1.0049 \end{bmatrix}, x^{(2)} = \begin{bmatrix} 7.2673 \\ 1.1555 \\ -0.8336 \\ 0.9801 \end{bmatrix}, x^{(3)} = \begin{bmatrix} 7.5790 \\ 2.2260 \\ -1.2646 \\ 1.5451 \end{bmatrix}, x^{(4)} = \begin{bmatrix} 7.2551 \\ 2.3995 \\ -1.2583 \\ 2.2825)) \end{bmatrix}, x^{(5)} = \begin{bmatrix} 6.9727 \\ 2.4206 \\ -1.1165 \\ 2.3935 \end{bmatrix}$$