$$\underline{\underline{C}} = \begin{pmatrix} 0.000 & -0.200 & -0.100 \\ -0.200 & 0.000 & -0.200 \\ -0.200 & -0.300 & 0.000 \end{pmatrix}; \qquad \underline{g} = \begin{pmatrix} 0.700 \\ -1.600 \\ 0.600 \end{pmatrix}; \qquad \underline{x_0} = \begin{pmatrix} 0.700 \\ -1.800 \\ 0.600 \end{pmatrix}$$

Diagonally dominant:

$$\underline{\alpha} = \begin{pmatrix} 0.300 \\ 0.400 \\ 0.500 \end{pmatrix}; \qquad ||\underline{\alpha}|| = 0.500000$$

Iterations:

$$\underline{x_1} = \begin{pmatrix} 1.000 \\ -1.860 \\ 1.000 \end{pmatrix}; \qquad \underline{d_1} = \begin{pmatrix} -0.300 \\ 0.060 \\ -0.400 \end{pmatrix}; \qquad d_k = 2.222222E-01$$

$$\underline{x_2} = \begin{pmatrix} 0.972 \\ -2.000 \\ 0.958 \end{pmatrix}; \qquad \underline{d_2} = \begin{pmatrix} 0.028 \\ 0.140 \\ 0.042 \end{pmatrix}; \qquad d_k = 7.526882E-02$$

$$\underline{x_3} = \begin{pmatrix} 1.004 \\ -1.986 \\ 1.006 \end{pmatrix}; \qquad \underline{d_3} = \begin{pmatrix} -0.032 \\ -0.014 \\ -0.048 \end{pmatrix}; \qquad d_k = 2.380000E-02$$

$$\underline{x_4} = \begin{pmatrix} 0.997 \\ -2.002 \\ 0.995 \end{pmatrix}; \qquad \underline{d_4} = \begin{pmatrix} 0.008 \\ 0.016 \\ 0.011 \end{pmatrix}; \qquad d_k = 8.036254E-03$$

$$\underline{x_5} = \begin{pmatrix} 1.001 \\ -1.998 \\ 1.001 \end{pmatrix}; \qquad \underline{d_5} = \begin{pmatrix} -0.004 \\ -0.004 \\ -0.006 \end{pmatrix}; \qquad d_k = 3.146916E-03$$

$$\underline{x_6} = \begin{pmatrix} 1.000 \\ -2.000 \\ 0.999 \end{pmatrix}; \qquad \underline{d_6} = \begin{pmatrix} 0.001 \\ 0.002 \\ 0.002 \end{pmatrix}; \qquad d_k = 1.056487E-03$$

$$\underline{x_7} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_7} = \begin{pmatrix} -0.001 \\ -0.001 \\ -0.001 \end{pmatrix}; \qquad d_k = 4.523825E-04$$

$$\underline{x_8} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_8} = \begin{pmatrix} 0.000 \\ 0.000 \\ 0.000 \end{pmatrix}; \qquad d_k = 1.607104E-04$$

$$\underline{x_9} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_9} = \begin{pmatrix} -0.000 \\ -0.000 \\ -0.000 \end{pmatrix}; \qquad d_k = 6.789744E-05$$

$$\underline{x_{10}} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_{10}} = \begin{pmatrix} 0.000 \\ 0.000 \\ 0.000 \end{pmatrix}; \qquad d_k = 2.561819E-05$$

$$\underline{x_{11}} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_{11}} = \begin{pmatrix} -0.000 \\ -0.000 \\ -0.000 \end{pmatrix}; \qquad d_k = 1.039762E-05$$

$$\underline{x_{12}} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_{12}} = \begin{pmatrix} 0.000 \\ 0.000 \\ 0.000 \end{pmatrix}; \qquad d_k = 4.024741E-06$$

$$\underline{x_{13}} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_{13}} = \begin{pmatrix} -0.000 \\ -0.000 \\ -0.000 \end{pmatrix}; \qquad d_k = 1.606370E-06$$

$$\underline{x_{14}} = \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix}; \qquad \underline{d_{14}} = \begin{pmatrix} 0.000 \\ 0.000 \\ 0.000 \end{pmatrix}; \qquad d_k = 6.285356E-07$$

Convergence, 14 iterations: 6.29E-07<1.00E-06

$$\underline{\underline{A}}\,\underline{x}^* - \underline{b} = \begin{pmatrix} 10.000 & 2.000 & 1.000 \\ 1.000 & 5.000 & 1.000 \\ 2.000 & 3.000 & 10.000 \end{pmatrix} \begin{pmatrix} 1.000 \\ -2.000 \\ 1.000 \end{pmatrix} - \begin{pmatrix} 7.000 \\ -8.000 \\ 6.000 \end{pmatrix} = \begin{pmatrix} -0.000 \\ -0.000 \\ -0.000 \end{pmatrix}$$

$$\underline{r} = \begin{pmatrix} -3.43E-06 \\ -2.12E-06 \\ -4.98E-06 \end{pmatrix}; \qquad ||r|| = 6.23E-07$$