TJ-32 机电特性矩阵

刚度系数矩阵

$$\begin{pmatrix} C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\ C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\ C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & C_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & C_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & C_{66} \end{pmatrix}^{E} = \begin{pmatrix} 6.8 & 2.9 & 3.2 & 0 & 0 & 0 \\ 2.9 & 6.8 & 3.2 & 0 & 0 & 0 \\ 3.2 & 3.2 & 6.0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2.3 & 0 & 0 \\ 0 & 0 & 0 & 0 & 2.3 & 0 \\ 0 & 0 & 0 & 0 & 0 & 2.0 \end{pmatrix}^{E} 10^{10}\,N/m^{2}$$

$$\begin{pmatrix} C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\ C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\ C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & C_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & C_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & C_{66} \end{pmatrix}^{D} = \begin{pmatrix} 6.8 & 2.9 & 3.1 & 0 & 0 & 0 \\ 2.9 & 6.8 & 3.1 & 0 & 0 & 0 \\ 3.1 & 3.1 & 6.9 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2.6 & 0 & 0 \\ 0 & 0 & 0 & 0 & 2.6 & 0 \\ 0 & 0 & 0 & 0 & 0 & 2.0 \end{pmatrix}^{D} 10^{10}\,N/m^{2}$$

弹性柔顺系数矩阵

$$\begin{pmatrix} S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\ S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\ S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & S_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & S_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & S_{66} \end{pmatrix}^{E} = \begin{pmatrix} 20.7 & -4.8 & -8.4 & 0 & 0 & 0 \\ -4.8 & 20.7 & -8.4 & 0 & 0 & 0 \\ -8.4 & -8.4 & 25.5 & 0 & 0 & 0 \\ 0 & 0 & 0 & 42.9 & 0 & 0 \\ 0 & 0 & 0 & 0 & 42.9 & 0 \\ 0 & 0 & 0 & 0 & 0 & 51.0 \end{pmatrix}^{E} 10^{-12}\,m^{2}/N$$

$$\begin{pmatrix} S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\ S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\ S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & S_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & S_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & S_{66} \end{pmatrix}^{D} = \begin{pmatrix} 20.0 & -5.5 & -6.5 & 0 & 0 & 0 \\ -5.5 & 20.0 & -6.5 & 0 & 0 & 0 \\ -6.5 & -6.5 & 20.3 & 0 & 0 & 0 \\ 0 & 0 & 0 & 37.9 & 0 & 0 \\ 0 & 0 & 0 & 0 & 37.9 & 0 \\ 0 & 0 & 0 & 0 & 0 & 51.0 \end{pmatrix}^{D} 10^{-12}\,m^{2}/N$$

受夹介电常数矩阵

$$\begin{pmatrix} \varepsilon_{11} & 0 & 0 \\ 0 & \varepsilon_{11} & 0 \\ 0 & 0 & \varepsilon_{33} \end{pmatrix}^{S} = \begin{pmatrix} 550 & 0 & 0 \\ 0 & 550 & 0 \\ 0 & 0 & 585 \end{pmatrix}^{S}$$

自由介电常数矩阵

$$\begin{pmatrix} \varepsilon_{11} & 0 & 0 \\ 0 & \varepsilon_{11} & 0 \\ 0 & 0 & \varepsilon_{33} \end{pmatrix}^{T} = \begin{pmatrix} 620 & 0 & 0 \\ 0 & 620 & 0 \\ 0 & 0 & 750 \end{pmatrix}^{T}$$

压电常数矩阵

$$\begin{pmatrix} 0 & 0 & 0 & 0 & d_{15} & 0 \\ 0 & 0 & 0 & d_{24} & 0 & 0 \\ d_{31} & d_{31} & d_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 165 & 0 \\ 0 & 0 & 0 & 165 & 0 & 0 \\ -66.7 & -66.7 & 185 & 0 & 0 & 0 \end{pmatrix} 10^{-12} C/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & g_{15} & 0 \\ 0 & 0 & 0 & g_{24} & 0 & 0 \\ g_{31} & g_{31} & g_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 30.1 & 0 \\ 0 & 0 & 0 & 30.1 & 0 & 0 \\ -10.1 & -10.1 & 27.9 & 0 & 0 & 0 \end{pmatrix} 10^{-3} Vm/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & e_{15} & 0 \\ 0 & 0 & 0 & e_{24} & 0 & 0 \\ e_{31} & e_{31} & e_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 3.8 & 0 \\ 0 & 0 & 0 & 3.8 & 0 & 0 \\ -0.5 & -0.5 & 6.8 & 0 & 0 & 0 \end{pmatrix} C/m^{2}$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & h_{15} & 0 \\ 0 & 0 & 0 & h_{24} & 0 & 0 \\ h_{31} & h_{31} & h_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 7.8 & 0 \\ 0 & 0 & 0 & 7.8 & 0 & 0 \\ -1.1 & -1.1 & 13.0 & 0 & 0 & 0 \end{pmatrix} 10^{8} V/m$$