TJ-41 机电特性矩阵

刚度系数矩阵

$$
\begin{pmatrix}
C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\
C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\
C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & C_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & C_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & C_{66}
\end{pmatrix}^{E}
=
\begin{pmatrix}
16.9 & 9.3 & 9.0 & 0 & 0 & 0 \\
9.3 & 16.9 & 9.0 & 0 & 0 & 0 \\
9.0 & 9.0 & 13.3 & 0 & 0 & 0 \\
0 & 0 & 0 & 3.3 & 0 & 0 \\
0 & 0 & 0 & 0 & 3.3 & 0 \\
0 & 0 & 0 & 0 & 0 & 3.7
\end{pmatrix}^{E}
10^{10}N/m^{2}
$$

$$
\begin{pmatrix}
C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\
C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\
C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & C_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & C_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & C_{66}
\end{pmatrix}^{D}
=
\begin{pmatrix}
16.9 & 9.4 & 8.2 & 0 & 0 & 0 \\
9.4 & 16.9 & 8.2 & 0 & 0 & 0 \\
8.2 & 8.2 & 18.0 & 0 & 0 & 0 \\
0 & 0 & 0 & 6.3 & 0 & 0 \\
0 & 0 & 0 & 0 & 6.3 & 0 \\
0 & 0 & 0 & 0 & 0 & 3.8
\end{pmatrix}^{D}
10^{10}N/m^{2}
$$

弹性柔顺系数矩阵

$$
\begin{pmatrix}
S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\
S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\
S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & S_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & S_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & S_{66}
\end{pmatrix}^{E}
=
\begin{pmatrix}
10.2 & -3.1 & -4.8 & 0 & 0 & 0 \\
-3.1 & 10.2 & -4.8 & 0 & 0 & 0 \\
-4.8 & -4.8 & 14.0 & 0 & 0 & 0 \\
0 & 0 & 0 & 30.4 & 0 & 0 \\
0 & 0 & 0 & 0 & 30.4 & 0 \\
0 & 0 & 0 & 0 & 0 & 26.6
\end{pmatrix}^{E}
10^{-12}m^{2}/N
$$

$$
\begin{pmatrix}
S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\
S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\
S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & S_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & S_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & S_{66}
\end{pmatrix}^{D}
=
\begin{pmatrix}
9.3 & -4.0 & -2.4 & 0 & 0 & 0 \\
-4.0 & 9.3 & -2.4 & 0 & 0 & 0 \\
-2.4 & -2.4 & 7.7 & 0 & 0 & 0 \\
0 & 0 & 0 & 15.9 & 0 & 0 \\
0 & 0 & 0 & 0 & 15.9 & 0 \\
0 & 0 & 0 & 0 & 0 & 26.6
\end{pmatrix}^{D}
10^{-12}m^{2}/N
$$

受夹介电常数矩阵

$$\begin{pmatrix} \varepsilon_{11} & 0 & 0 \\ 0 & \varepsilon_{11} & 0 \\ 0 & 0 & \varepsilon_{33} \end{pmatrix}^{S} = \begin{pmatrix} 390 & 0 & 0 \\ 0 & 390 & 0 \\ 0 & 0 & 300 \end{pmatrix}^{S}$$

自由介电常数矩阵

$$\begin{pmatrix} \varepsilon_{11} & 0 & 0 \\ 0 & \varepsilon_{11} & 0 \\ 0 & 0 & \varepsilon_{33} \end{pmatrix}^{T} = \begin{pmatrix} 750 & 0 & 0 \\ 0 & 750 & 0 \\ 0 & 0 & 520 \end{pmatrix}^{T}$$

压电常数矩阵

$$\begin{pmatrix} 0 & 0 & 0 & 0 & d_{15} & 0 \\ 0 & 0 & 0 & d_{24} & 0 & 0 \\ d_{31} & d_{31} & d_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 310 & 0 \\ 0 & 0 & 0 & 310 & 0 & 0 \\ -65 & -65 & 170 & 0 & 0 & 0 \end{pmatrix} 10^{-12} C/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & g_{15} & 0 \\ 0 & 0 & 0 & g_{24} & 0 & 0 \\ g_{31} & g_{31} & g_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 46.5 & 0 \\ 0 & 0 & 0 & 46.5 & 0 & 0 \\ -14.0 & -14.0 & 37.0 & 0 & 0 & 0 \end{pmatrix} 10^{-3} Vm/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & e_{15} & 0 \\ 0 & 0 & 0 & e_{24} & 0 & 0 \\ e_{31} & e_{31} & e_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 10.2 & 0 \\ 0 & 0 & 0 & 10.2 & 0 & 0 \\ -1.7 & -1.7 & 10.9 & 0 & 0 & 0 \end{pmatrix} C/m^{2}$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & h_{15} & 0 \\ 0 & 0 & 0 & h_{24} & 0 & 0 \\ h_{31} & h_{31} & h_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 29.3 & 0 \\ 0 & 0 & 0 & 29.3 & 0 & 0 \\ -6.5 & -6.5 & 43.6 & 0 & 0 & 0 \end{pmatrix} 10^{8} V/m$$