TJ-45D 机电特性矩阵

刚度系数矩阵

$$
\begin{pmatrix}
C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\
C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\
C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & C_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & C_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & C_{66}
\end{pmatrix}^{E}
=
\begin{pmatrix}
18.3 & 12.6 & 11.5 & 0 & 0 & 0 \\
12.6 & 18.3 & 11.5 & 0 & 0 & 0 \\
11.5 & 11.5 & 13.5 & 0 & 0 & 0 \\
0 & 0 & 0 & 2.6 & 0 & 0 \\
0 & 0 & 0 & 0 & 2.6 & 0 \\
0 & 0 & 0 & 0 & 0 & 2.9
\end{pmatrix}^{E}
10^{10} N/m^{2}
$$

$$
\begin{pmatrix}
C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\
C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\
C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & C_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & C_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & C_{66}
\end{pmatrix}^{D}
=
\begin{pmatrix}
18.5 & 12.7 & 10.5 & 0 & 0 & 0 \\
12.7 & 18.5 & 10.5 & 0 & 0 & 0 \\
10.5 & 10.5 & 16.1 & 0 & 0 & 0 \\
0 & 0 & 0 & 5.0 & 0 & 0 \\
0 & 0 & 0 & 0 & 5.0 & 0 \\
0 & 0 & 0 & 0 & 0 & 2.9
\end{pmatrix}^{D}
10^{10} N/m^{2}
$$

弹性柔顺系数矩阵

$$
\begin{pmatrix}
S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\
S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\
S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & S_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & S_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & S_{66}
\end{pmatrix}^{E}
=
\begin{pmatrix}
13.1 & -4.2 & -7.6 & 0 & 0 & 0 \\
-4.2 & 13.1 & -7.6 & 0 & 0 & 0 \\
-7.6 & -7.6 & 20.4 & 0 & 0 & 0 \\
0 & 0 & 0 & 38.4 & 0 & 0 \\
0 & 0 & 0 & 0 & 38.4 & 0 \\
0 & 0 & 0 & 0 & 0 & 34.6
\end{pmatrix}^{E}
10^{-12} m^{2}/N
$$

$$
\begin{pmatrix}
S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\
S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\
S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\
0 & 0 & 0 & S_{44} & 0 & 0 \\
0 & 0 & 0 & 0 & S_{55} & 0 \\
0 & 0 & 0 & 0 & 0 & S_{66}
\end{pmatrix}^{D}
=
\begin{pmatrix}
11.5 & -5.8 & -3.7 & 0 & 0 & 0 \\
-5.8 & 11.5 & -3.7 & 0 & 0 & 0 \\
-3.7 & -3.7 & 11.0 & 0 & 0 & 0 \\
0 & 0 & 0 & 20.1 & 0 & 0 \\
0 & 0 & 0 & 0 & 20.1 & 0 \\
0 & 0 & 0 & 0 & 0 & 34.6
\end{pmatrix}^{D}
10^{-12} m^{2}/N
$$

受夹介电常数矩阵

$$\begin{pmatrix} \varepsilon_{11} & 0 & 0 \\ 0 & \varepsilon_{11} & 0 \\ 0 & 0 & \varepsilon_{33} \end{pmatrix}^S = \begin{pmatrix} 875 & 0 & 0 \\ 0 & 875 & 0 \\ 0 & 0 & 740 \end{pmatrix}^S$$

自由介电常数矩阵

$$\begin{pmatrix} \varepsilon_{11} & 0 & 0 \\ 0 & \varepsilon_{11} & 0 \\ 0 & 0 & \varepsilon_{33} \end{pmatrix}^T = \begin{pmatrix} 1670 & 0 & 0 \\ 0 & 1670 & 0 \\ 0 & 0 & 1550 \end{pmatrix}^T$$

压电常数矩阵

$$\begin{pmatrix} 0 & 0 & 0 & 0 & d_{15} & 0 \\ 0 & 0 & 0 & d_{24} & 0 & 0 \\ d_{31} & d_{31} & d_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 520 & 0 \\ 0 & 0 & 0 & 520 & 0 & 0 \\ -150 & -150 & 360 & 0 & 0 & 0 \end{pmatrix} 10^{-12} C/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & g_{15} & 0 \\ 0 & 0 & 0 & g_{24} & 0 & 0 \\ g_{31} & g_{31} & g_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 35.0 & 0 \\ 0 & 0 & 0 & 35.0 & 0 & 0 \\ -11.0 & -11.0 & 26.0 & 0 & 0 & 0 \end{pmatrix} 10^{-3} Vm/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & e_{15} & 0 \\ 0 & 0 & 0 & e_{24} & 0 & 0 \\ e_{31} & e_{31} & e_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 13.5 & 0 \\ 0 & 0 & 0 & 13.5 & 0 & 0 \\ -4.9 & -4.9 & 14.1 & 0 & 0 & 0 \end{pmatrix} C/m^2$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & h_{15} & 0 \\ 0 & 0 & 0 & h_{24} & 0 & 0 \\ h_{31} & h_{31} & h_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 17.5 & 0 \\ 0 & 0 & 0 & 17.5 & 0 & 0 \\ -7.0 & -7.0 & 18.8 & 0 & 0 & 0 \end{pmatrix} 10^8 V/m$$