解：由题意得：总传递矩阵为：$\begin{bmatrix}1 & \frac{1}{f_2'}\\ 0 & 1\end{bmatrix}\begin{bmatrix}1 & 0\\ -d & 1\end{bmatrix}\begin{bmatrix}1 & \frac{1}{f_1'}\\ 0 & 1\end{bmatrix}$

$$=\begin{bmatrix}1-\frac{d}{f_2'} & \frac{1}{f_1'}+\frac{1}{f_2'}-\frac{d}{f_1'f_2'}\\ -d & 1-\frac{d}{f_1'}\end{bmatrix}$$

$$\Rightarrow\begin{bmatrix}u'\\ y'\end{bmatrix}=\begin{bmatrix}1-\frac{d}{f_2'} & \frac{1}{f_1'}+\frac{1}{f_2'}-\frac{d}{f_1'f_2'}\\ -d & 1-\frac{d}{f_1'}\end{bmatrix}\begin{bmatrix}-f_1'\\ y\end{bmatrix},$$

对比薄透镜传递矩阵可得：

$$\left|\frac{1}{f}\right|=\frac{1}{f_1'}+\frac{1}{f_2'}-\frac{d}{f_1'f_2'}$$

$$\Rightarrow f=\left|\frac{f_1'f_2'}{f_1'+f_2'-d}\right|$$

$$\Rightarrow f=\frac{f_1'f_2'}{d-f_1'-f_2'}$$，传递矩阵可转化为 $\begin{bmatrix}\frac{1}{\beta} & \frac{1}{f}\\ 0 & \beta\end{bmatrix}$ 形式

易得 $\beta=-\dfrac{1-\left(1-\frac{d}{f_1'}\right)}{1-\left(1-\frac{d}{f_2'}\right)}=-\dfrac{f_2'}{f_1'}\Rightarrow\beta=-\dfrac{f_2'}{f_1'}$

同理其主点位置 $l_H=\dfrac{\frac{d}{f_2'}}{\frac{1}{f_1'}+\frac{1}{f_2'}-\frac{d}{f_1'f_2'}}=-\dfrac{f_1'd}{d-f_1'-f_2'}$

$$l_H'=\frac{\frac{d}{f_1'}}{\frac{1}{f_1'}+\frac{1}{f_2'}-\frac{d}{f_1'f_2'}}=-f_2'd/(d-f_1'-f_2')$$

焦点位置：$l_F=\left(\dfrac{d}{f_2'}-1\right)\Big/\left(\dfrac{1}{f_1'}+\dfrac{1}{f_2'}-\dfrac{d}{f_1'f_2'}\right)=\dfrac{f_1'(d-f_2')}{f_1'+f_2'-d}$

$$l_F'=\frac{f_2'(d-f_1')}{f_1'+f_2'-d}$$

节点位置：$l_J=\dfrac{1-\left(1-\frac{d}{f_2'}\right)}{\frac{1}{f_1'}+\frac{1}{f_2'}-\frac{d}{f_1'f_2'}}=-\dfrac{f_1'd}{d-f_1'-f_2'}$

$$l_J'=\frac{1-\left(1-\frac{d}{f_1'}\right)}{\frac{1}{f_1'}+\frac{1}{f_2'}-\frac{d}{f_1'f_2'}}=-\frac{f_2'd}{d-f_1'-f_2'}$$

可以看出在 $n=n'$ 即两侧同介质情况下，主点与节点重合