

The diagram shows a curved beam element of length $L/2$ in a local coordinate system $(\hat{\mathbf{e}}_1, \hat{\mathbf{e}}_2)$. The beam starts at $\hat{s} = 0$ and ends at $\hat{s} = 1/2$. At $\hat{s} = 0$, there is a fixed support with reaction forces $EIP_1/L^2 \hat{\mathbf{f}}_1$ (horizontal) and $EIP_2/L^2 \hat{\mathbf{f}}_2$ (vertical). At $\hat{s} = 1/2$, there is a free end with an applied force $\frac{F_2(\tau)}{2} \hat{\mathbf{f}}_2$ (vertical) and a moment M (curved arrow). The beam's shape is defined by a dashed line, and the horizontal distance between the support and the free end is $L/2$.