Computed answers (ANS) are compared to Euler-Bernoulli (EB) beam theory via the relative difference: \((\text{ANS} – \text{EB})/\text{EB}\)

**Vibration modes of a fixed-fixed beam**

\[ \omega_{EB,n} = \frac{k_n^2 h}{L^2} \sqrt{\frac{E}{12 \rho}} \]

\[ l = \cos(k_n) \cosh(k_n) \]

**Computed stiffness for AFM tip**

\[ \delta_{EB} = \frac{PL^3}{16Ebh^3} \]

**Linear electrostatic force deflection**

\[ \delta_{EB} = \frac{wL^4}{32Ebh^3} \]

\[ w = b \varepsilon \frac{\phi^2}{2y^2} \]