

$$q = q \quad \lambda := 1.825 \cdot 10^{-4} \quad l := 2.293 \cdot 10^{-4} \quad E := 2.1 \cdot 10^8 \quad \lambda := 8 \quad h := 5$$

$$P(q) := \frac{q \cdot l}{4} \quad a := \frac{E \cdot l}{l} \quad b := \frac{E \cdot l}{h} \quad \text{ORIGIN} := 1$$

$$\lambda(q) := q \cdot \frac{h}{l} \cdot \frac{\left(\frac{3 \cdot \frac{h}{l}}{1} \right)}{\left(6 \cdot \frac{h}{l} + 1 \right)}$$

$$N79(q) := \frac{q \cdot l}{4} - T(q) \quad N810(q) := \frac{q \cdot l}{4} + T(q)$$

$$N57(q) := \frac{3}{4} \cdot q \cdot l - 2 \cdot T(q) \quad N68(q) := \frac{3}{4} \cdot q \cdot l + 2 \cdot T(q)$$

$$N25(q) := \frac{5}{4} \cdot q \cdot l - 3 \cdot T(q) \quad N36(q) := \frac{5}{4} \cdot q \cdot l + 3 \cdot T(q)$$

$$\lambda79(q) := \sqrt{\frac{N79(q)}{E \cdot l}} \cdot h$$

$$D79(q) := 2 - 2 \cdot \cos(\lambda79(q)) - \lambda79(q) \cdot \sin(\lambda79(q))$$

$$\omega79(q) := \frac{\lambda79(q)^2 \cdot (1 - \cos(\lambda79(q)))}{D79(q)} \quad \chi79(q) := \frac{\lambda79(q) \cdot (\lambda79(q) - \sin(\lambda79(q)))}{D79(q)} \quad \phi79(q) := \frac{\lambda79(q) \cdot (\sin(\lambda79(q)) - \lambda79(q) \cdot \cos(\lambda79(q)))}{D79(q)}$$

$$\lambda57(q) := \sqrt{\frac{N57(q)}{E \cdot l}} \cdot h$$

$$D57(q) := 2 - 2 \cdot \cos(\lambda57(q)) - \lambda57(q) \cdot \sin(\lambda57(q))$$

$$\omega57(q) := \frac{\lambda57(q)^2 \cdot (1 - \cos(\lambda57(q)))}{D57(q)} \quad \chi57(q) := \frac{\lambda57(q) \cdot (\lambda57(q) - \sin(\lambda57(q)))}{D57(q)} \quad \phi57(q) := \frac{\lambda57(q) \cdot (\sin(\lambda57(q)) - \lambda57(q) \cdot \cos(\lambda57(q)))}{D57(q)}$$

$$\lambda25(q) := \sqrt{\frac{N25(q)}{E \cdot l}} \cdot h$$

$$D25(q) := 2 - 2 \cdot \cos(\lambda25(q)) - \lambda25(q) \cdot \sin(\lambda25(q))$$

$$\omega25(q) := \frac{\lambda25(q)^2 \cdot (1 - \cos(\lambda25(q)))}{D25(q)} \quad \chi25(q) := \frac{\lambda25(q) \cdot (\lambda25(q) - \sin(\lambda25(q)))}{D25(q)} \quad \phi25(q) := \frac{\lambda25(q) \cdot (\sin(\lambda25(q)) - \lambda25(q) \cdot \cos(\lambda25(q)))}{D25(q)}$$

$$\lambda810(q) := \sqrt{\frac{N810(q)}{E \cdot l}} \cdot h$$

$$D810(q) := 2 - 2 \cdot \cos(\lambda810(q)) - \lambda810(q) \cdot \sin(\lambda810(q))$$

$$\omega810(q) := \frac{\lambda810(q)^2 \cdot (1 - \cos(\lambda810(q)))}{D810(q)} \quad \chi810(q) := \frac{\lambda810(q) \cdot (\lambda810(q) - \sin(\lambda810(q)))}{D810(q)} \quad \phi810(q) := \frac{\lambda810(q) \cdot (\sin(\lambda810(q)) - \lambda810(q) \cdot \cos(\lambda810(q)))}{D810(q)}$$

$$\lambda68(q) := \sqrt{\frac{N68(q)}{E \cdot l}} \cdot h$$

$$D68(q) := 2 - 2 \cdot \cos(\lambda68(q)) - \lambda68(q) \cdot \sin(\lambda68(q))$$

$$\omega68(q) := \frac{\lambda68(q)^2 \cdot (1 - \cos(\lambda68(q)))}{D68(q)} \quad \chi68(q) := \frac{\lambda68(q) \cdot (\lambda68(q) - \sin(\lambda68(q)))}{D68(q)} \quad \phi68(q) := \frac{\lambda68(q) \cdot (\sin(\lambda68(q)) - \lambda68(q) \cdot \cos(\lambda68(q)))}{D68(q)}$$

$$\lambda36(q) := \sqrt{\frac{N36(q)}{E \cdot l}} \cdot h$$

$$D36(q) := 2 - 2 \cdot \cos(\lambda36(q)) - \lambda36(q) \cdot \sin(\lambda36(q))$$

$$\omega36(q) := \frac{\lambda36(q)^2 \cdot (1 - \cos(\lambda36(q)))}{D36(q)} \quad \chi36(q) := \frac{\lambda36(q) \cdot (\lambda36(q) - \sin(\lambda36(q)))}{D36(q)} \quad \phi36(q) := \frac{\lambda36(q) \cdot (\sin(\lambda36(q)) - \lambda36(q) \cdot \cos(\lambda36(q)))}{D36(q)}$$

$$\lambda(q) := \sqrt{\frac{P(q)}{E \cdot l}} \cdot l$$

$$D(q) := 2 - 2 \cdot \cos(\lambda(q)) - \lambda(q) \cdot \sin(\lambda(q))$$

$$\omega(q) := \frac{\lambda(q)^2 \cdot (1 - \cos(\lambda(q)))}{D(q)} \quad \chi(q) := \frac{\lambda(q) \cdot (\lambda(q) - \sin(\lambda(q)))}{D(q)} \quad \phi(q) := \frac{\lambda(q) \cdot (\sin(\lambda(q)) - \lambda(q) \cdot \cos(\lambda(q)))}{D(q)}$$

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$$A79(q) := \left(\frac{2 \cdot \omega79(q)}{h^2} - \frac{N79(q)}{E \cdot l} \right) \quad A57(q) := \left(\frac{2 \cdot \omega57(q)}{h^2} - \frac{N57(q)}{E \cdot l} \right) \quad A25(q) := \left(\frac{2 \cdot \omega25(q)}{h^2} - \frac{N25(q)}{E \cdot l} \right)$$

$$A810(q) := \left(\frac{2 \cdot \omega810(q)}{h^2} - \frac{N810(q)}{E \cdot l} \right) \quad A68(q) := \left(\frac{2 \cdot \omega68(q)}{h^2} - \frac{N68(q)}{E \cdot l} \right) \quad A36(q) := \left(\frac{2 \cdot \omega36(q)}{h^2} - \frac{N36(q)}{E \cdot l} \right)$$

$$C(q) := \begin{bmatrix} b \cdot \left(\frac{-\omega25(q)}{h} + \frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{-\omega57(q)}{h} \right) & 0 & a \cdot (\phi(q)) + b \cdot (\phi25(q) + \phi57(q)) & a \cdot (\chi(q)) & b \cdot (\chi57(q)) & 0 & 0 & 0 \\ b \cdot \left(\frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{-\omega57(q)}{h} + \frac{\omega79(q)}{h} \right) & b \cdot \left(\frac{-\omega79(q)}{h} \right) & b \cdot (\chi57(q)) & 0 & a \cdot (\phi(q)) + b \cdot (\phi57(q) + \phi79(q)) & a \cdot (\chi(q)) & b \cdot (\chi79(q)) & 0 \\ 0 & b \cdot \left(\frac{\omega79(q)}{h} \right) & b \cdot \left(\frac{-\omega79(q)}{h} \right) & 0 & 0 & b \cdot (\chi79(q)) & 0 & a \cdot (\phi(q)) + b \cdot (\phi79(q)) & a \cdot (\chi(q)) \\ b \cdot \left(\frac{\omega68(q)}{h} - \frac{\omega36(q)}{h} \right) & b \cdot \left(\frac{-\omega68(q)}{h} \right) & 0 & a \cdot (\chi(q)) & a \cdot (\phi(q)) + b \cdot (\phi68(q) + \phi36(q)) & 0 & b \cdot (\chi68(q)) & 0 & 0 \\ b \cdot \left(\frac{\omega68(q)}{h} \right) & b \cdot \left(\frac{\omega810(q)}{h} - \frac{\omega68(q)}{h} \right) & b \cdot \left(\frac{-\omega810(q)}{h} \right) & 0 & b \cdot (\chi68(q)) & a \cdot (\chi(q)) & a \cdot (\phi(q)) + b \cdot (\phi810(q) + \phi68(q)) & 0 & b \cdot (\chi810(q)) \\ 0 & b \cdot \left(\frac{\omega810(q)}{h} \right) & b \cdot \left(\frac{-\omega810(q)}{h} \right) & 0 & 0 & 0 & b \cdot (\chi810(q)) & a \cdot (\chi(q)) & a \cdot (\phi(q)) + b \cdot (\phi810(q)) \\ b \cdot (A25(q) + A57(q) + A36(q) + A68(q)) & b \cdot (-A57(q) - A68(q)) & 0 & b \cdot \left(\frac{-\omega25(q)}{h} + \frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{-\omega36(q)}{h} + \frac{\omega68(q)}{h} \right) & b \cdot \left(\frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{\omega68(q)}{h} \right) & 0 & 0 \\ b \cdot (-A57(q) - A68(q)) & b \cdot (A57(q) + A79(q) + A68(q) + A810(q)) & b \cdot (-A79(q) - A810(q)) & b \cdot \left(\frac{-\omega57(q)}{h} \right) & b \cdot \left(\frac{-\omega68(q)}{h} \right) & b \cdot \left(\frac{-\omega57(q)}{h} + \frac{\omega79(q)}{h} \right) & b \cdot \left(\frac{-\omega68(q)}{h} + \frac{\omega810(q)}{h} \right) & b \cdot \left(\frac{\omega79(q)}{h} \right) & b \cdot \left(\frac{\omega810(q)}{h} \right) \\ 0 & b \cdot (-A79(q) - A810(q)) & b \cdot (-A79(q) + A810(q)) & 0 & 0 & b \cdot \left(\frac{-\omega79(q)}{h} \right) & b \cdot \left(\frac{-\omega810(q)}{h} \right) & b \cdot \left(\frac{-\omega79(q)}{h} \right) & b \cdot \left(\frac{-\omega810(q)}{h} \right) \end{bmatrix}$$

$$q := 20 \quad n(q) := |C(q)|$$

$$\text{Given} \quad q0 := 20$$

$$m(|C(q)|) = 0 \quad \text{root}(n(q0), q0) = \bullet$$

Find(q) = \bullet

Here I tried to use a 6x6 matrix, just to simplify the problem, but it's the same thing

$$C6 := \begin{bmatrix} b \cdot \left(\frac{-\omega25(q)}{h} + \frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{-\omega57(q)}{h} \right) & a \cdot (\phi(q)) + b \cdot (\phi25(q) + \phi57(q)) & a \cdot (\chi(q)) & b \cdot (\chi57(q)) & 0 \\ b \cdot \left(\frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{-\omega57(q)}{h} + \frac{\omega79(q)}{h} \right) & b \cdot (\chi57(q)) & 0 & a \cdot (\phi(q)) + b \cdot (\phi57(q) + \phi79(q)) & a \cdot (\chi(q)) \\ b \cdot \left(\frac{\omega68(q)}{h} - \frac{\omega36(q)}{h} \right) & b \cdot \left(\frac{-\omega68(q)}{h} \right) & a \cdot (\chi(q)) & a \cdot (\phi(q)) + b \cdot (\phi68(q) + \phi36(q)) & 0 & b \cdot (\chi68(q)) \\ b \cdot \left(\frac{\omega68(q)}{h} \right) & b \cdot \left(\frac{\omega810(q)}{h} - \frac{\omega68(q)}{h} \right) & 0 & b \cdot (\chi68(q)) & a \cdot (\chi(q)) & a \cdot (\phi(q)) + b \cdot (\phi810(q) + \phi68(q)) \\ 0 & b \cdot \left(\frac{\omega810(q)}{h} \right) & 0 & 0 & 0 & b \cdot (\chi810(q)) \\ b \cdot (A25(q) + A57(q) + A36(q) + A68(q)) & b \cdot (-A57(q) - A68(q)) & b \cdot \left(\frac{-\omega25(q)}{h} + \frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{-\omega36(q)}{h} + \frac{\omega68(q)}{h} \right) & b \cdot \left(\frac{\omega57(q)}{h} \right) & b \cdot \left(\frac{\omega68(q)}{h} \right) \end{bmatrix}$$

$$\lambda := 20$$

Given

$$|C6(q)| = 0$$

Find(q) = \bullet

