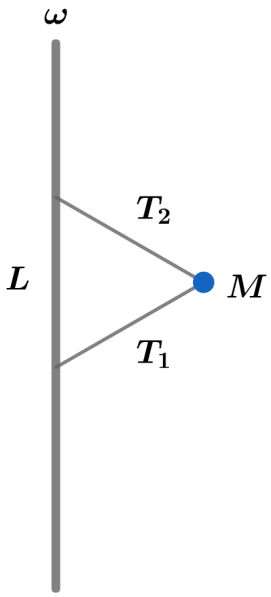
2019A F=ma Exam: Problem 22

Kevin S. Huang



We can check limiting cases:

At small ω, the bottom string is slack so $T_1 = 0$ and $r = T_1/T_2 = 0$. There is some critical angular velocity ω_c where T_1 becomes nonzero.

At large ω, gravity is negligible since tension increases with angular velocity while weight remains constant so $T_1 = T_2$ and $r = T_1/T_2 = 1$.

Thus, the answer is $\boxed{\text{C}}$.