

[mex12] Fixed points of the plane pendulum

Consider the equation of motion

$$\ddot{\theta} + 2\beta\dot{\theta} + \omega_0^2 \sin \theta = 0,$$

where $\omega_0 = \sqrt{g/L}$ is the characteristic frequency and β is the damping parameter. Determine the nature of the two fixed points (a) for zero damping ($\beta = 0$) and (b) for weak damping ($\beta < \omega_0$).

Solution: