

Shooting method for pendulum

Let $v_0^{(n)}$ be a guess at $y'(0)$.

Solve ODE with IC $y(0) = \alpha$, $y'(0) = v_0^{(n)}$

Let error $e^{(n)} = y(T) - \beta$.

Make new guess $v_0^{(n+1)}$, e. g. using an approximate Newton's method:

$$v_0^{(n+1)} - v_0^{(n)} = - \frac{e^{(n)}}{\left\{ \frac{e^{(n)} - e^{(n-1)}}{v_0^{(n)} - v_0^{(n-1)}} \right\}}$$

