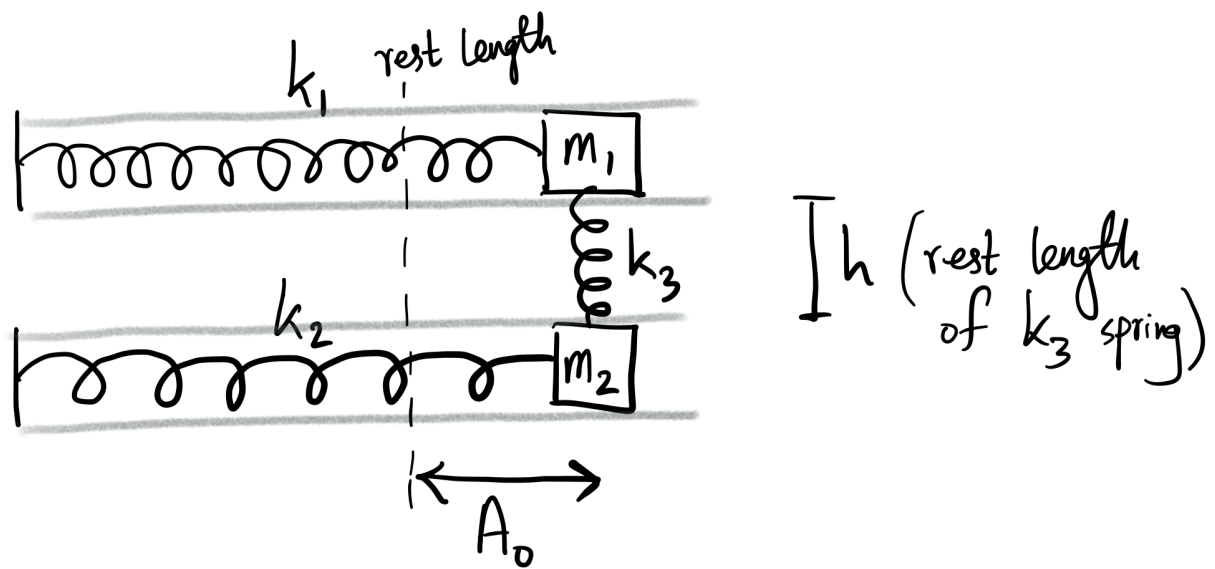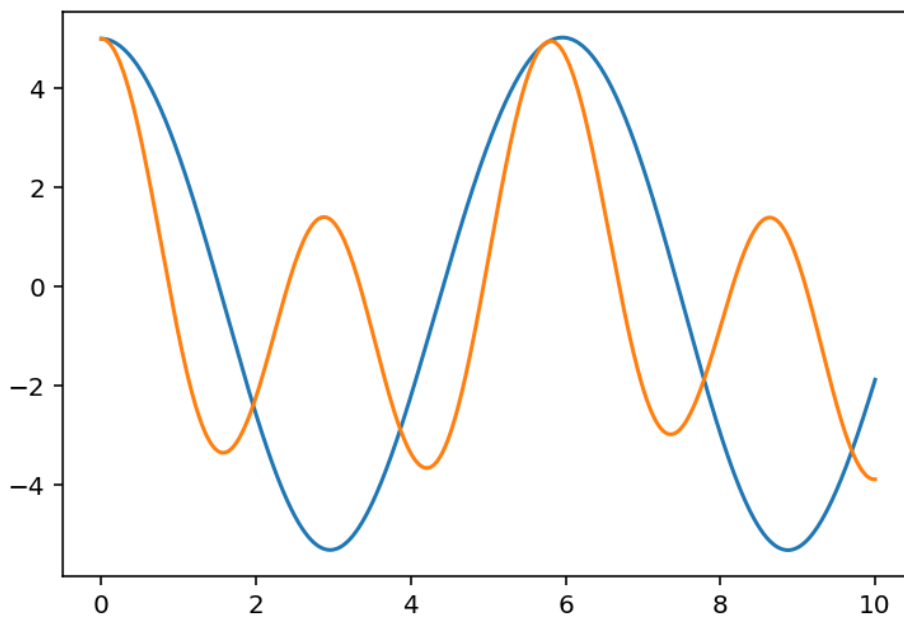Preamble:

Example plot:

(For the given initial conditions in the code)