Example. Euler’s method is used to solve the following IVPs. Find the largest value of the step size $h$ that can be used such that the numerical solutions decay.

(a) Mass-spring problem

$$\frac{1}{2}y'' + 2y' + \frac{1}{2}y = 0, \quad t > 0, \quad y(0) = 1, \quad y'(0) = 0$$

(b) Constant-coefficient system $y' = Ay, \ t > 0$, where $A$ is a $3 \times 3$ matrix with eigenvalues $\lambda = -3$ and $-2 \pm 5i$. 