

Sharif University of Technology  
Department of Electrical Engineering  
**Assignment #1 for Linear Control System**

Fall 2010

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The following problems from your textbook (Dorf):

Chapter 2: E2.4, E2.8, E2.14, E2.17, E2.21, E2.22, E2.28, P2.1, P2.6, P2.12, P2.18, P2.37, P2.38

Chapter 3: E3.5, E3.7, E3.11, E3.16, E3.21, P3.2, P3.4, P3.11, P3.15

Problem 1: A spring-mass-damper system is shown in Figure 1. The motion of the mass, denoted by  $y(t)$ , is described by the differential equation

$$M\ddot{y}(t) + b\dot{y}(t) + ky(t) = r(t)$$

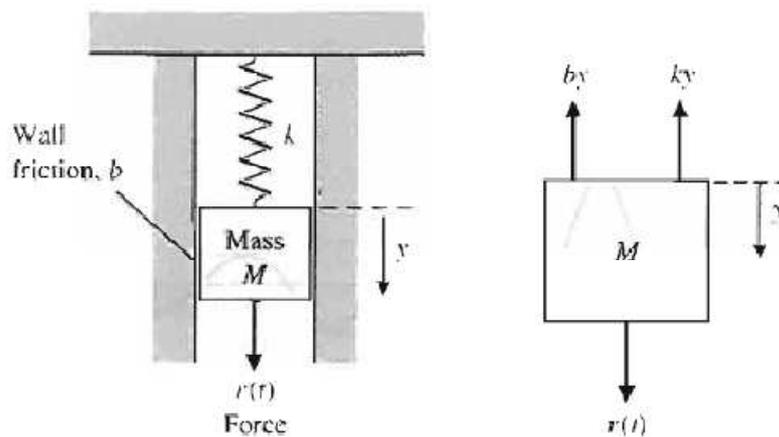


Figure 1

Assume that  $\frac{k}{M} = 2$ ,  $\frac{b}{M} = 1$ ,  $y(0) = 0.2$  m. Plot unforced dynamic response  $y(t)$  of this system via Matlab. ( $r(t) = 0$ )