## Homework 9: due 03/30/18 EE 324: Signals and Systems II

## 1 System realization

Realize the following filters using RLC circuits (the solutions are not unique)

1. 
$$H(s) = \frac{1}{s/1000+1}$$
  
2.  $H(s) = \frac{s/1000}{s/1000+1}$   
3.  $H(s) = \frac{1}{(s/1000)^2 + \sqrt{2}s/1000+1}$ 

## 2 Filter design

1. Low-pass Butterworth filter of order 2 with cutoff frequency  $\omega_c = 500 \ rad/s$ 

2. High-pass Butterworth filter of order 2 with cutoff frequency  $\omega_c = 5000 \ rad/s$ 

3. Band-pass Butterworth filter of order 2 with midband frequency  $\omega_0 = 1000 \ rad/s$  and bandwidth  $B = 100 \ rad/s$