

HW #2 (100%) Due: 03/31

**[MATLAB EXERCISE]**

1. (25%) Considering the constant coefficients difference equation of a causal system  $y[n] = 0.25y[n-2] + 3x[n-1] - x[n-2]$ , please answer the following questions:
  - (1) Find its transfer function, and show the pole-zero plot of this system.
  - (2) Specify its R.O.C. and plot the first 20 samples of the corresponding impulse response.
  - (3) Find its inverse system  $H_i$ , plot its magnitude and phase response for  $0 \leq \omega \leq 2\pi$ .
  - (4) Verify the relationships between the magnitude responses, phase responses of the system  $H$  and its inverse system  $H_i$ .
  - (5) Are  $H$  and  $H_i$  both stable? Verify your answer.

(Hint: MATLAB commands: zplane; impz; freqz)

**[TEXTBOOK PROBLEMS]**

2. (15%) 3.6 (c)(d)(e) (just choose one method)
3. (15%) 3.7
4. (12%) 3.41
5. (12%) 3.44
6. (21%) 3.46