

# Test 3 - No.1

## DSP

### Exercises

1. Consider the system described by the following system function:

$$H(z) = \frac{(z - 1)^2}{(z + 1)^2}$$

- a. (1p) Draw the pole-zero diagram
- b. (2p) Sketch the amplitude response  $|H(\omega)|$  and specify what kind of filter it is
- c. (3p) Compute the amplitude response  $|H(\omega)|$  and the phase response  $\angle H(\omega)$  of the filter
- d. (2p) Compute the output  $y[n]$  if the input signal is  $x[n] = 2 \cos(\frac{\pi}{2}n + \frac{\pi}{4})$ ,  $n \in \mathbb{Z}$
- e. (1p) Is this a linear-phase system? Justify the answer.