

# MAE 444/544 Digital Control Systems

## Homework 2

1. Consider the system described by

$$y(k) - 0.6y(k-1) - 0.81y(k-2) + 0.67y(k-3) - 0.12y(k-4) = x(k)$$

where  $x(k)$  is the input and  $y(k)$  is the output of the system. Determine the stability of the system

2. Consider the following characteristic equation

$$P(z) = z^3 - 1.3z^2 - 0.08z + 0.2 = 0$$

Determine whether or not any of the roots of the characteristic equation lie outside the unit circle in the  $z$ -plane. Use the bilinear transformation and the Routh stability criterion