

Approximate Discretization

It may be much easier to calculate an approximate discrete model based on the small-time steps approach.

$$e^{AT_s} \approx (I + AT_s)$$

The approximate solution then becomes:

$$x_{k+1} \approx (I + AT_s)x_k + T_s Bu_k$$

This is also known as Euler's method.

$T_s=1e-3$;

$A=[0 \ 1; -5 \ -0.7]$;

$B=[0 \ 0; 0.5 \ 1]$;

$A_d=(eye(2)+A*T_s)$;

$B_d=T_s*B$;