ECE 2017

16BMD0016
Ritobrita De

TASK-1

Understanding the Basic of MATLAB

Mention Application of MATLAB:

A highly efficient language for technical computation is called MATLAB. It combines visual, computations, and programming in an easy-to-use environment where problems and solutions are given in well-known mathematical expressions. It is used for:

- Algorithm development
- Scientific and engineering graphics
- Modelling, simulation, and prototyping
- Application development, including Graphical User Interface building
- Math and computation
- Data analysis, exploration, and visualization

What are the Toolboxes in MATLAB?

- Neural Network Toolbox
- Optimization Toolbox
- Statistics and Machine Learning Toolbox
- Symbolic Math Toolbox
- Control System Toolbox
- Fuzzy Logic Toolbox
- Robotics System Toolbox
- Robust Control Toolbox
- Communications System Toolbox
- DSP System Toolbox
- Signal Processing Toolbox
- Wavelet Toolbox
- Image Acquisition Toolbox
- Image Processing Toolbox
- Mapping Toolbox
- Data Acquisition Toolbox
- Image Acquisition Toolbox
- Instrument Control Toolbox
- OPC Toolbox

ECE 2017

16BMD0016
Ritobrita De

Explore the various Commands used in control system toolbox

A. zpk

Create zero-pole-gain model; convert to zero-pole-gain model.

```
sys = zpk(Z,P,K)
sys = zpk(Z,p,k,Ts)
sys = zpk(M)
sys = zpk(Z,p,k,ltisys)
s = zpk('s')
z = zpk('z',Ts)
zsys = zpk(sys)
zsys = zpk(sys, 'measured')
zsys = zpk(sys, 'noise')
zsys = zpk(sys, 'augmented')
```

B. tf

Create transfer function model, convert to transfer function model

```
sys = tf(Numerator,Denominator)
sys = tf(Numerator,Denominator,Ts)
sys = tf(M)
sys = tf(Numerator,Denominator,ltisys)
tfsys = tf(sys)
tfsys = tf(sys, 'measured')
tfsys = tf(sys, 'noise')
tfsys = tf(sys, 'augmented')
```

C. filt

Specify discrete transfer functions in DSP format

```
sys = filt(num,den)
sys = filt(num,den,Ts)
sys = filt(M)
```

D. size

Query output/ input/ array dimensions of input-output model and number of frequencies of FRD model.

```
d=size (sys)
Ny=size(sys,1)
Ny=size(sys,2)
```

E. Step

Step Response plot of dynamic system.

```
step(sys)
step(sys,Tfinal)
```

F. Impulse

Impulse response plot of a dynamic system; impulse response data.

```
impulse(sys)
impulse(sys,Tfinal)
```

G. Bode

Bode plot of frequency response, magnitude and phase of frequency response.

```
bode(sys)
bode(sys1,…sysn)
[mag,phase] = bode(sys,w)
```

H. Nyquist

Nyquist plot of frequency response.

```
Nyquist(sys)
nyquist(sys,w)
[re,im,w] = nyquist(sys)
```

I. Rlocus

Root locus plt of a dynamic system.

```
rlocus(sys)
rlocus(sys1…sysn)
[r,k] = rlocus(sys)
R = rlocus(sys,k)
```

J. Freqresp

Frequency response over grid.

```
[H,wout] = freqresp(sys)
H = freqresp(sys,w)
H = freqresp(sys,w,units)
```