Some Useful Matlab and Control Systems Toolbox Functions

Creating and converting linear models

tf	Create (or convert to) a transfer function model.
zpk	Create (or convert to) a zero/pole/gain model.
ss	Create (or convert to) a state-space model.
feedback	Feedback connection of two systems.
c2d	Continuous to discrete conversion.
d2c	Discrete to continuous conversion.

Model analysis

dcgain	D.C. (low frequency) gain.
bandwidth	System bandwidth.
pole	System poles.
eig	System eigenvalues.
zero	System zeros.
pzmap	Pole-zero map.
damp	Natural frequency and damping of system poles.
ltiview	Response analysis GUI (LTI Viewer).
step	Step response.
impulse	Impulse response.
lsim	Response to arbitrary inputs.
bode	Bode diagrams of the frequency response.
ctrb	Controllability matrix (for ss models).
obsv	Observability matrix (for ss models).
poly	Convert roots to polynomial.

Design tools

place	MIMO pole placement.
acker	SISO pole placement.
sisotool	SISO design GUI (root locus and loop shaping techniques).
rlocus	Evans root locus.
rltool	Runs the SISO design GUI set up for root locus.

Data visualization and storage

figure	Create figure window.
clf	Clear current figure.
plot	Plot data.
stairs	Stair-step graph.
save	Save workspace variables to disk.
load	Load workspace variables from disk.

Simulink – MATLAB

trim	Finds steady state parameters for a Simulink system.
linmod	Linearize a Simulink model around an operating point.

Simulink blocks

Integrator		Continuous-time integration of the input signal.
Derivative		Numerical derivative: `du/dt`.
Gain		Element-wise gain (`y=K.*u`) or matrix gain (`y=K*u` or `y=u*K`).
Sum		Add or substract inputs.
Step		Output a step.
Scope