Matave Control Toolbox

Applied Control Engineering Toolbox for MATLAB and GNU Octave

Version 6.0

Model building

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
tf	Crate transfer function model	Done	No	N/N	Y
zpk	Create zero-pole-gain model	Done	No	N/N	Y
ss	Create state space model	Done	Yes	N/N	Y

Model transformation

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
minreal	Minimal realization	Done	Yes	Y/Y	Y
balreal	Balanced realization	Done	Yes	N/Y	Y
modred	Model reduction	Done	Yes	N/Y	Y
append	Append systems	Done	Yes	Y/Y	Y
feedback	Feedback model	Done	Yes	Y/Y	Y
series	Serial model	Done	Yes	Y/Y	Y
parallel	Parallel model	Done	Yes	Y/Y	Y
pade	Internal time delay to model	Done	Yes	Y/N	Y

Model data access

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
dcgain	Get the low frequency gain	Done	Yes	Y/Y	Y
pzmap	Plot poles and zeros	Done	Yes	Y/Y	Y
damp	Get the damping	Done	Yes	Y/Y	Y
pole	Get poles	Done	Yes	Y/Y	Y
zero	zeros for SISO	Done	No	Y/Y	Y
tzero	zeros for MIMO	Done	Yes	N/Y	Y

Model conversions

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
c2d	Convert continuous to discrete	Done	Yes	Y/Y	N
c2dt	Convert continuous to discrete with delay	Done	Yes	Y/Y	N
d2c	Convert discrete to continuous	Done	Yes	Y/Y	Y
d2d	Rediscrete the model	Done	Yes	Y/Y	Y
tf2ss	Transfer function to state space	Done	No	Y/N	Y
ss2tf	State space to transfer function	Done	Yes	N/Y	Y

Frequency domain analysis

Function name	**Description**	**Status**	***MIMO***	***TF/SS***	***Discrete***
evalfr	Get one frequency	Done	Yes	Y/Y	Y
freqresp	Get multiple frequencies	Done	Yes	Y/Y	Y
bode	Bode diagram	Done	Yes	Y/Y	Y
bodemag	Bode diagram without phase	Done	Yes	Y/Y	Y
nyquist	Nyquist diagram	Done	Yes	Y/Y	Y
sigma	Singular value diagram	Done	Yes	Y/Y	Y
margin	Stability margins	Done	Yes	Y/Y	Y
allmargin	Show all margin	Done	Yes	Y/Y	Y
sensitivity	Show sensitivity margins	Done	Yes	Y/Y	Y
db2mag	Convert dB to magnintude	Done	Yes	Y/Y	Y
mag2db	Conver magnintude to dB	Done	Yes	Y/Y	Y
rlocus	Root locus plot	Done	Yes	Y/Y	Y
findmaxgain	Compute the max gain limit	Done	Yes	Y/Y	Y
dBdrop	Find the frequency at 3 dB drop	Done	Yes	Y/Y	Y

Time domain analysis

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
gensig	Generate signals	Done	No	N/N	Y
impulse	Impulse response	Done	Yes	Y/Y	Y
step	Step response	Done	Yes	Y/Y	Y
ramp	Ramp response	Done	Yes	Y/Y	Y
initial	Response with initial conditions	Done	Yes	N/Y	Y
lsim	Linear simulation response	Done	Yes	Y/Y	Y
satlsim	Saturation linear simulation	Done	Yes	Y/Y	Y

Singel variable control

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
pid	Parallel PID controller	Done	No	N/N	Y
pipd	Serial PID controller	Done	No	N/N	Y
loop	Loopshaping controller	Done	No	Y/N	Y
acker	Acker formula	Done	No	N/Y	Y

Multivariable control

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
lqr	Linear quadratic regulator	Done	Yes	N/Y	Y
lqe	Linear quadratic estimator	Done	Yes	N/Y	Y
lqi	Linear quadratic integral	Done	Yes	N/Y	Y
reg	Generates the LQ-model	Done	Yes	N/Y	Y
lqgreg	Generates the Gaussian LQG-model	Done	Yes	N/Y	Y
lmpc	Simulate a linear Model Predictive Control	Done	Yes	N/Y	Y

Matrix equations

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
lyap	Solve Lyapunov equation	Done	Y	N/N	Y
are	Solve algibraic riccati equation	Done	Y	N/Y	Y
obsv	Observbility matrix	Done	Y	N/Y	Y
ctrb	Controllbility matrix	Done	Y	N/Y	Y
gram	Gramian	Done	Y	N/Y	Y
hsvd	Hankel singular values	Done	Y	N/Y	Y
covar	Covaraiance matrix	Done	Y	N/Y	Y

Compensators

Function name	***Description***	***Status***	***MIMO***	***TF/SS***	***Discrete***
smithpredict	Otto Smith delay compensator	Done	No	Y/N	Y
imc	Disturbance compensator	Done	No	Y/N	Y

Miscellaneous

Function name	***Description***	***Status***	***Internet connection***
updatematavecontrol	Update the Matavecontrol library	Done	Y