Solid   Transform1   F1

ReferenceFrame   Transform   F

Solid

Transform1

ReferenceFrame

Transform

1

F1

2

F

Constant 2 → [JA2] Goto21
Constant1 1 → [JB1] Goto13
Constant2 1 → [JB2] Goto14
Constant3 1 → [kt] Goto15
Constant4 1 → [ke] Goto16
Constant5 0.005 → [L] Goto17
Constant6 1 → [R] Goto18
Constant7 0 → [x1initial] Goto19

Constant10 1 → [k1] Goto11
Constant11 1 → [K2] Goto24
Constant12 1 → [k3] Goto25
Constant13 1 → [k4] Goto26
Constant14 1 → [k5] Goto27
Constant15 1 → [k6] Goto28

plant

[x2] From → x2
[x3] From1 → x3
[x4] From15 → x4
[x5] From2 → x5
[x6] From3 → x6
[JA2] From4 → JA2
[JB1] From5 → JB1
[JB2] From6 → JB2
[kt] From7 → kt
[ke] From8 → ke
[L] From9 → L
[R] From10 → R
[u1] From11 → u1
[u2] From12 → u2

x1

x2dot → $\frac{1}{s}$ Integrator → $\frac{1}{x_{os}}$ Integrator1 → [x1] Goto4
[x2] Goto
[x1initial] From16

x4dot → $\frac{1}{s}$ Integrator2 → $\frac{1}{s}$ Integrator3 → Scope3, [x3] Goto1, [x4] Goto5

x5dot → $\frac{1}{s}$ Integrator4 → [x5] Goto2 → 1 tA

x6dot → $\frac{1}{s}$ Integrator5 → [x6] Goto3 → 2 tB

output

1 qA → x1
2 qAd → x2
3 qB → x3
4 qBd → x4
[x5] From20 → x5
[x6] From21 → x6
[JA2] From22 → JA2
[JB1] From23 → JB1
[JB2] From24 → JB2

y 2dot → $\frac{1}{s}$ Integrator7 → Scope1, [y2] Goto6
y 1 → Scope2, [y1] Goto23
y 1d → [y1d] Goto7
y 1dd → [y1dd] Goto9
y 2d → [y2d] Goto8
y 2dd → [y2dd] Goto22

Linear Controller

[k1] → k1
[K2] → k2
[k3] → k3
[k4] → k4
[k5] → k5
[k6] → k6
[y1] y4 → y 1
[y1d] → y 1d
[y1dd] → y 1dd
[y2] y5 → y 2
[y2d] → y 2d
[y2dd] → y 2dd

Nu1
Nu2

Nonlinear Controller

[x1] → x1
[x2] → x2
[x3] → x3
[x4] → x4
[x5] → x5
[x6] → x6
Nu1
Nu2
[JA2] → JA2
[JB1] → JB1
[JB2] → JB2
[ke] → ke
[kt] → kt
[R] → R
[L] → L

u1 → Scope4, [u1] Goto20
u2 → Scope5, [u2] Goto12

```
function [u1,u2] = fcn(x1,x2,x3,x4,x5,x6,Nu1,Nu2,JA2,JB1,JB2,ke,kt,R,L)
%#codegen
u1 = kt.^(-1).*(L.*Nu1.*(JA2+JB2.*cos(x3))+ke.*kt.*x2+(R+(-1).*JB2.*L.*(JA2+JB2.*cos(x3)).^(-1).*sin(x3).*x4).*x5);


u2 = kt.^(-1).*(JA2+JB2.*cos(x3)).^(-1).*(x4.*((JA2+JB2.*cos(x3)).*(ke.*kt+JB1.*L.*x2.^2)+JB1.*L.*tan(x1).*x5)+(JA2+JB2.*cos(x3)).*(
```

```
function [Nu1,Nu2] = fcn(k1,k2,k3,k4,k5,k6,y1,y1d,y1dd,y2,y2d,y2dd)
%#codegen

Nu1 = (-1).*k3.*y1+(-1).*k2.*y1d+(-1).*k1.*y1dd;
Nu2 = (-1).*k6.*y2+(-1).*k5.*y2d+(-1).*k4.*y2dd;
```

```
function [y2dot,y1,y1d,y1dd,y2d,y2dd] = fcn(x1,x2,x3,x4,x5,x6,JA2,JB1,JB2)
%#codegen


y2dot = cos(x1).*x4;
y1 = x1;


y2d = cos(x1).*x4;
y2dd = (-1).*sin(x1).*x2.*x4+JB1.^(-1).*cos(x1).*x6;
y1d = x2;
y1dd = (JA2+JB2.*cos(x3)).^(-1).*x5;
```

```
function [x2dot,x4dot,x5dot,x6dot] = fcn(x1,x2,x3,x4,x5,x6,JA2,JB1,JB2,kt,ke,L,R,u1,u2)
%#codegen
x2dot = ((JA2+JB2.*cos(x3)).^(-1).*x5)-0.4*x1-0.4*x2;
x4dot = (JB1.^(-1).*x6)-0.4*x3-0.4*x4;
x5dot = (1).*kt.*L.^(-1).*u1+(-1).*ke.*kt.*L.^(-1).*x2+(-1).*L.^(-1).*R.*x5;
x6dot = (1).*kt.*L.^(-1).*u2+(-1).*ke.*kt.*L.^(-1).*x4+(-1).*L.^(-1).*R.*x6;
```