Sliding Mode Controller for One Robot Considering Non-Holononimic Contraints and Dynamics

based on paper "Sliding mode control for trajectory tracking of nonholonomic wheeled mobile robots", Jung-Min Yang et. al

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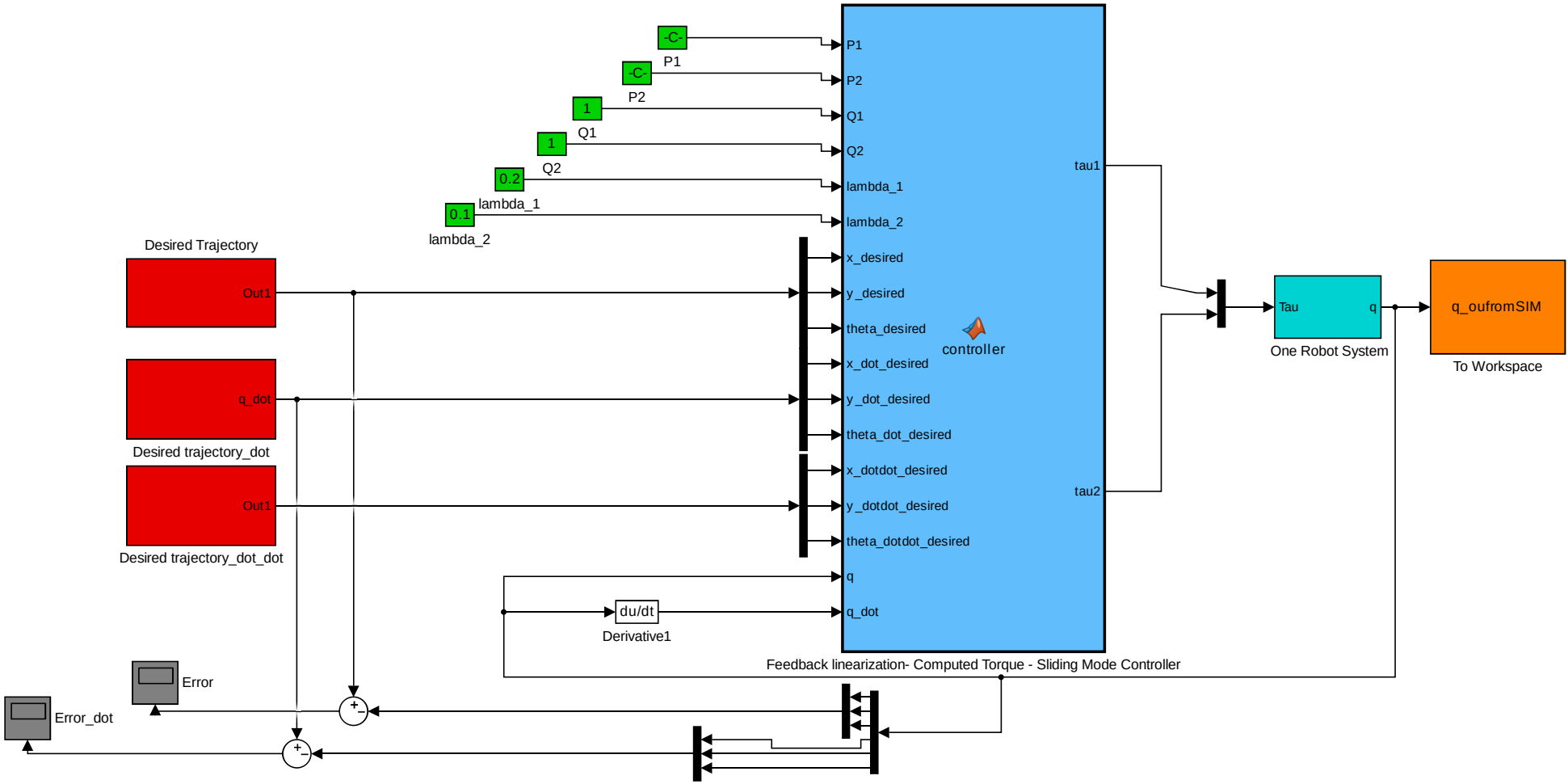
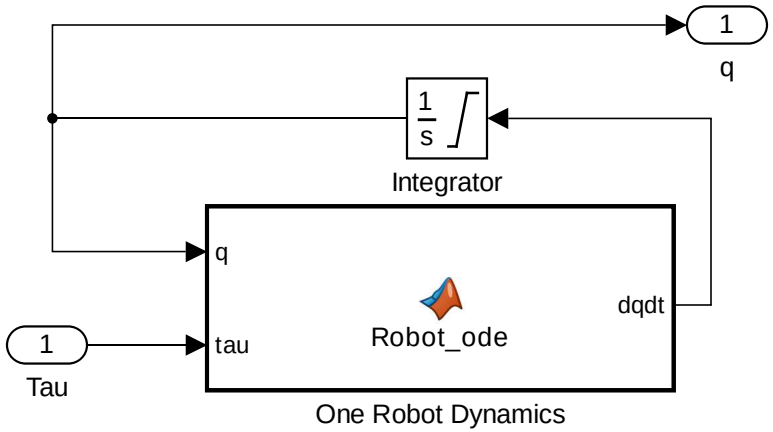
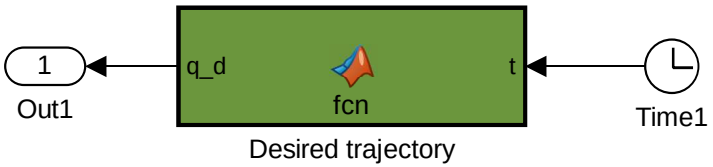
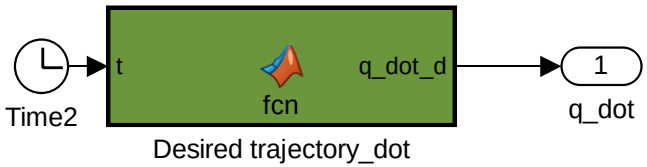



1
q
1
s
Integrator
q
dqdt
Robot_ode
1
tau
Tau
One Robot Dynamics

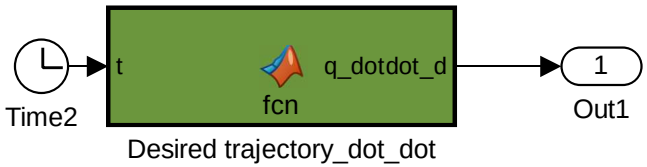
```
function dqdt= Robot_ode(q,tau)
dqdt=zeros(6,1);
% global tau_l tau_r;
tau_l=tau(1);
tau_r=tau(2);

x_dot=q(4);
y_dot=q(5);
theta=q(3);
theta_dot=q(6);
q_dotdot = Qdotdot(tau_l,tau_r,theta,theta_dot,x_dot,y_dot);

dqdt(1)=q(4);
dqdt(2)=q(5);
dqdt(3)=q(6);
dqdt(4)=(q_dotdot(1));
dqdt(5)=(q_dotdot(2));
dqdt(6)=(q_dotdot(3));
```


1
Out1
q_d
fcn
t
Time1
Desired trajectory

```
function q_d = fcn(t)

q_d = q_desired(t);
```


t
fcn
q_dot_d
1
Time2
q_dot
Desired trajectory_dot

```
function q_dot_d = fcn(t)

q_dot_d = q_dot_desired(t);
```


Time2
t
fcn
q_dotdot_d
1
Out1
Desired trajectory_dot_dot

```
function q_dotdot_d = fcn(t)

q_dotdot_d = q_dotdot_desired(t);
```

```
function [tau1,tau2]= controller(P1,P2,Q1,Q2,lambda_1,lambda_2,x_desired,y_desired,theta_desired,x_dot_desired,y_dot_desired,theta_d

theta=q(3);
theta_dot=q(6);
x_dotdot=q_dot(4);
y_dotdot=q_dot(5);
theta_dotdot=q_dot(6);
x=q(1);
y=q(2);
x_dot=q(4);
y_dot=q(5);
vc=sqrt(x_dot^2+y_dot^2);

u=U_sliding(P1,P2,Q1,Q2,lambda_1,lambda_2,theta,theta_dot,theta_desired,theta_dot_desired,x,x_dot,x_desired,x_dot_desired,x_dotdot_d

Tau= Tau_fdbckln(theta,theta_dot,theta_dotdot_desired,x_dot,x_dotdot_desired,y_dot,y_dotdot_desired)+ Hqfun(theta)*u;
tau1=Tau(1);
tau2=Tau(2);
```