

```
function [dz] = qc_sh1(t,z,ZR)

% -----
% Quarter-car model - Semi-active damping
% Skyhook 1
% -----

z1 = z(1); % Sprung mass displacement
z2 = z(2); % Unsprung mass displacement
dz1 = z(3); % Sprung mass velocity
dz2 = z(4); % Unsprung mass velocity
zr = ZR(t); % Road elevation

% Fill in parameters and equations to
% calculate the accelerations of the
% sprung and unsprung mass.

ms = 400;
mus = 40;
ks = 30e3;
kt = 200e3;
c_max = 3000;
c_min = 500;

if dz1*(dz1-dz2) <= 0
    c = c_min;
else
    c = c_max;
end

ddz1 = (-c*(dz1-dz2)-ks*(z1-z2))/ms; % Sprung mass acceleration
ddz2 = (kt*zr-c*(dz2-dz1)-ks*(z2-z1)-kt*z2)/mus; % Unsprung mass acceleration

dz = [dz1 dz2 ddz1 ddz2]';
```