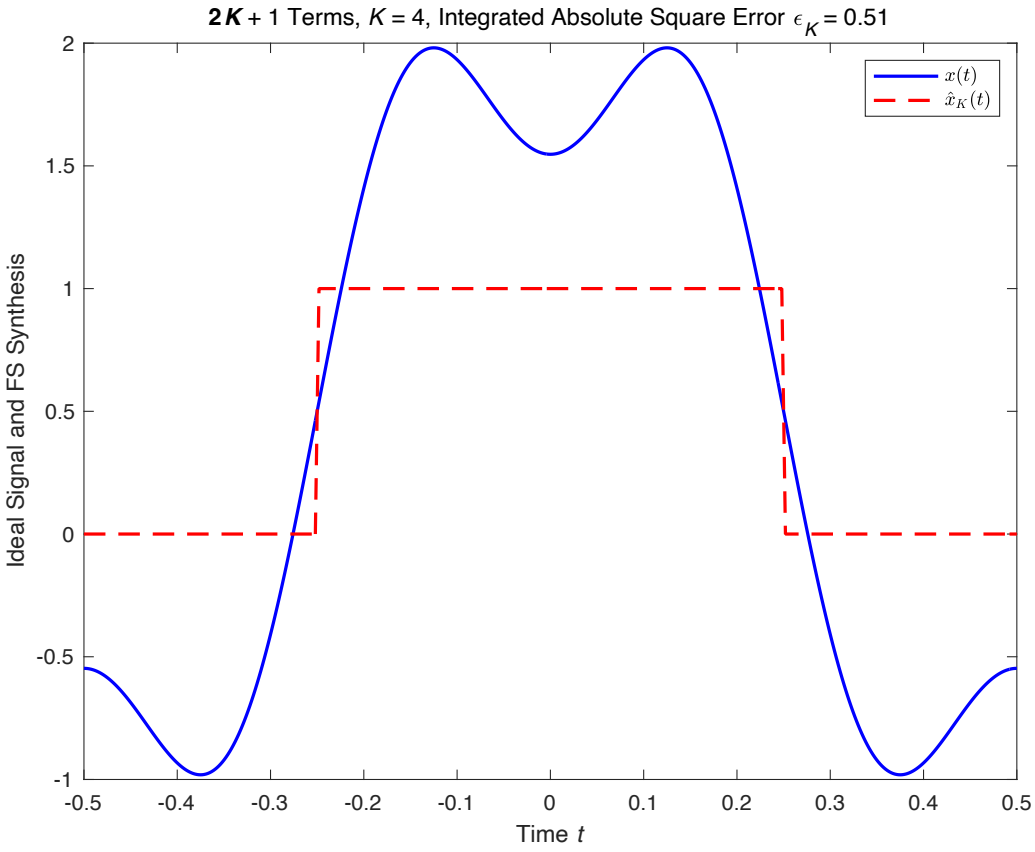
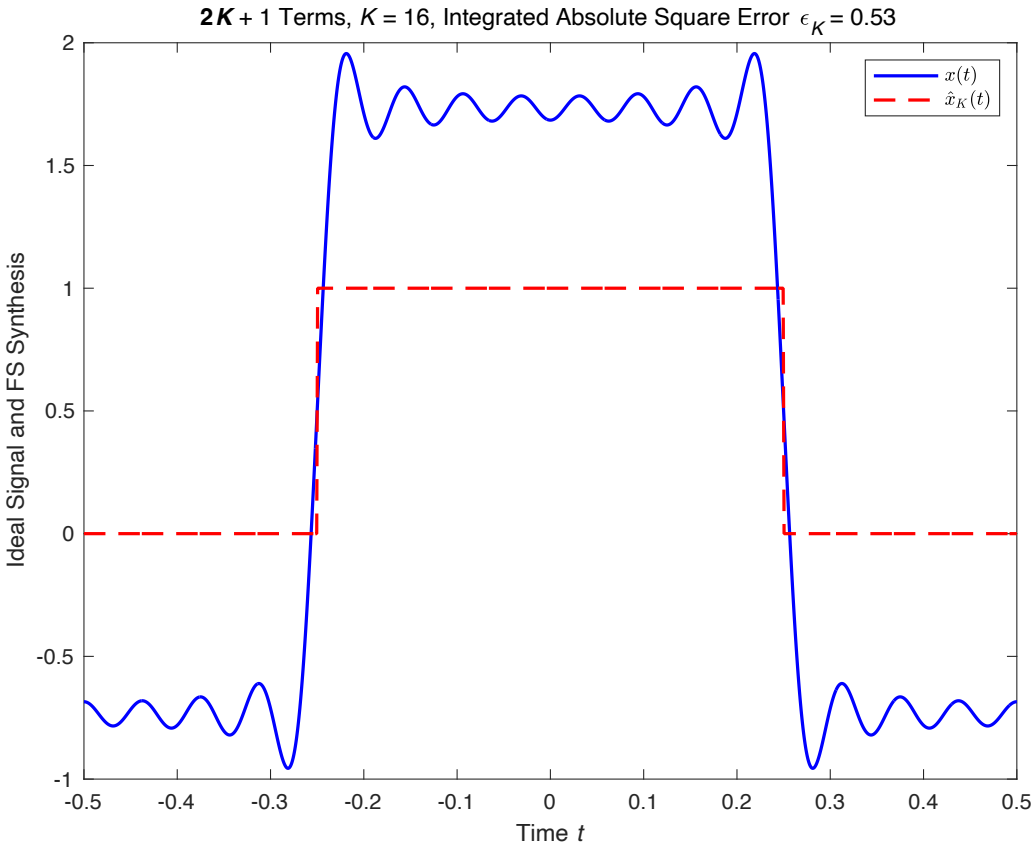
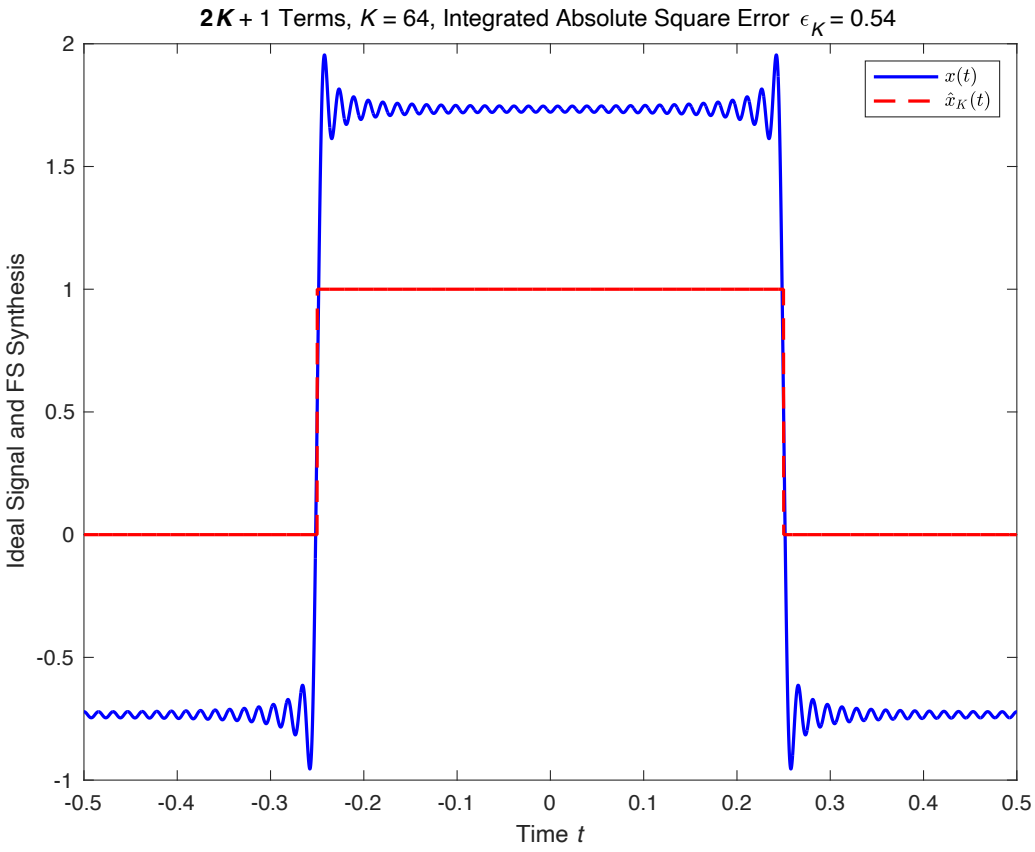
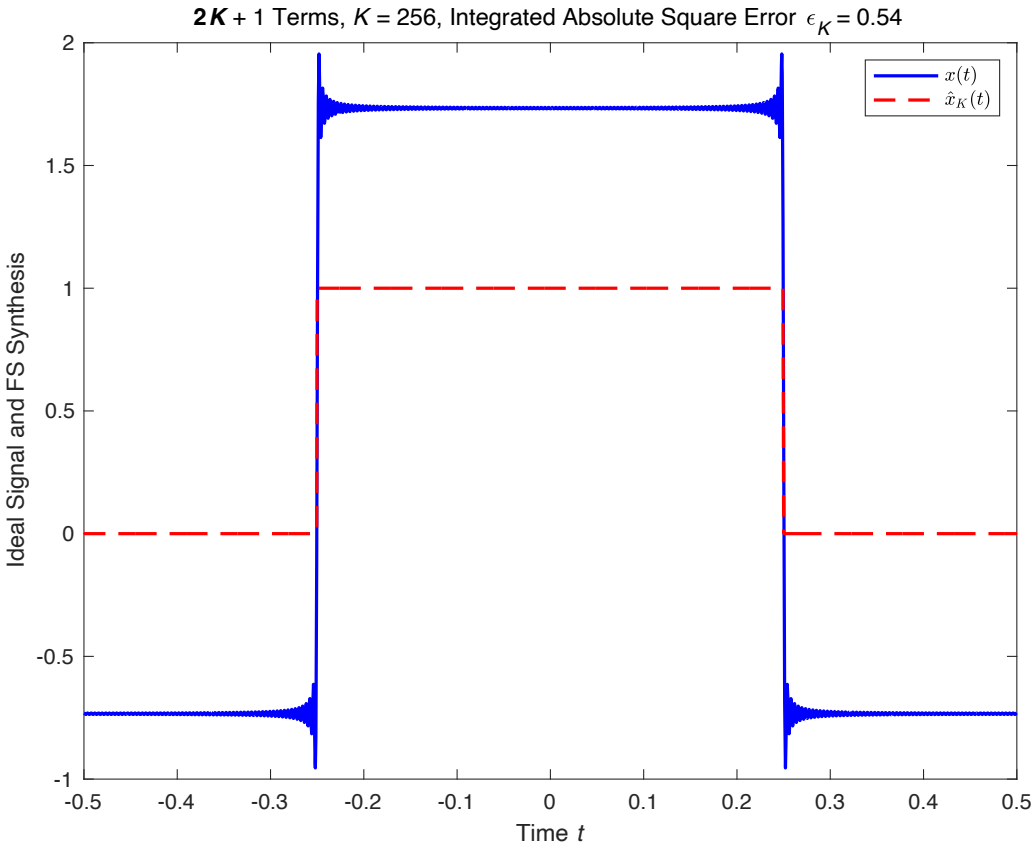
```
function ak = a_rectpulsetrain(k,omega0,T1)
if k == 0
    ak = omega0*T1/pi;
else
    ak = omega0*T1/pi*sin(k*omega0*T1)/k*omega0*T1;
end
```



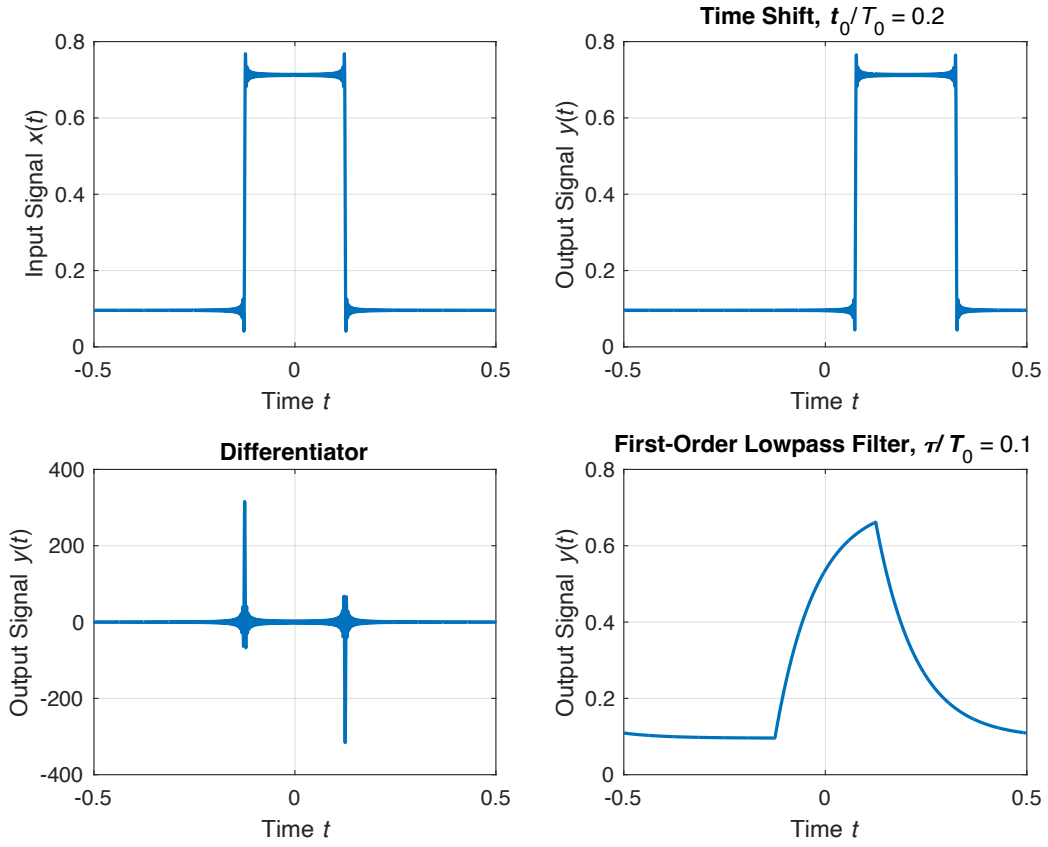

2K + 1 Terms, K = 16, Integrated Absolute Square Error ϵ_K = 0.53
x(t)
x̂_K(t)
Ideal Signal and FS Synthesis
Time t
2
1.5
1
0.5
0
-0.5
-1
-0.5
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5


2K + 1 Terms, K = 64, Integrated Absolute Square Error ϵ_K = 0.54
x(t)
x̂_K(t)
Ideal Signal and FS Synthesis
Time t
2
1.5
1
0.5
0
-0.5
-1
-0.5
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5

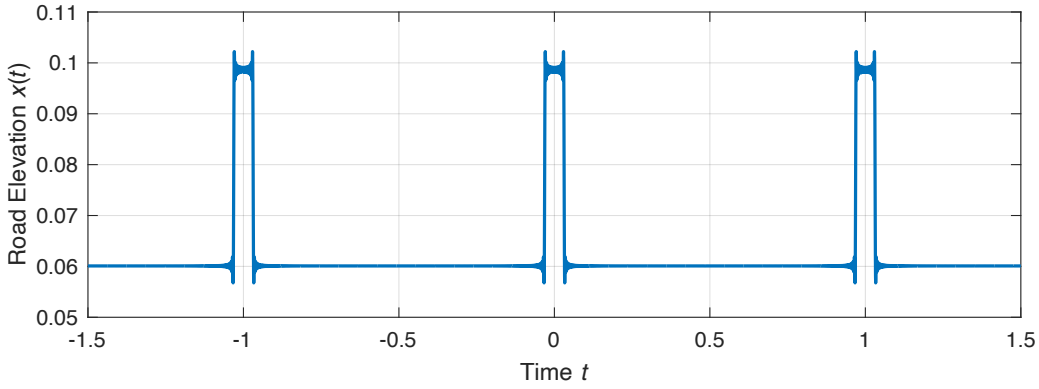


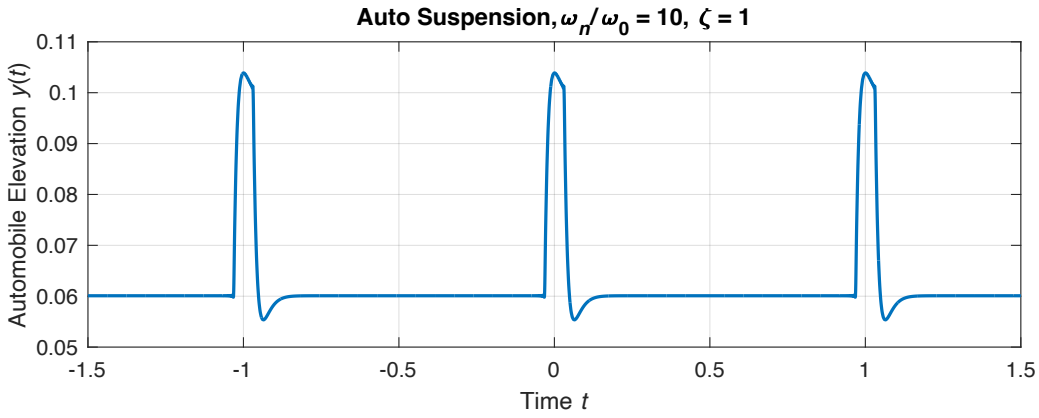
As k becomes bigger and bigger, the reconstruction error in Fourier series became smaller and smaller, and the reconstructed signal becomes closer and closer to the original signal.

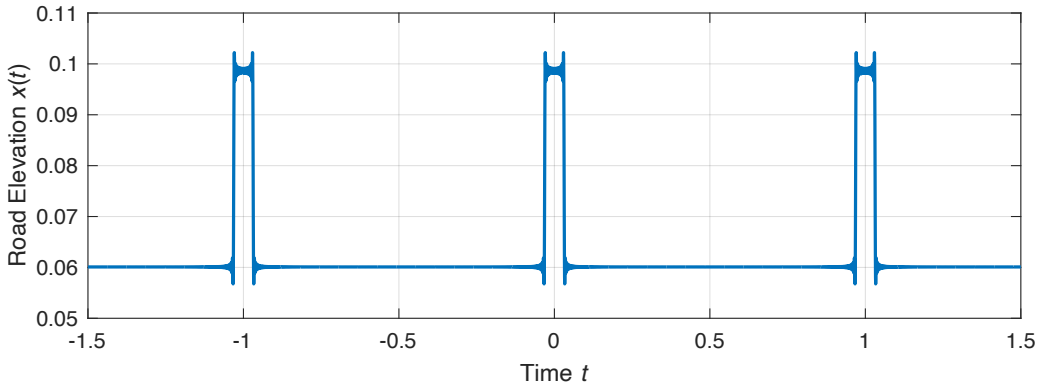
```
function H = Hdiff(omega)
H = sqrt(-1)*omega;
end

function H = Hfolpf(omega,tau)
H = 1/(1+sqrt(-1)*omega*tau);
end
```

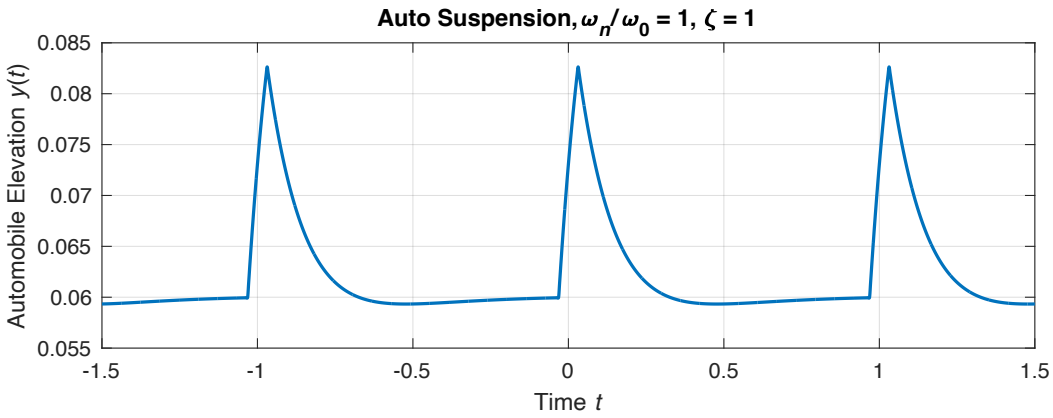


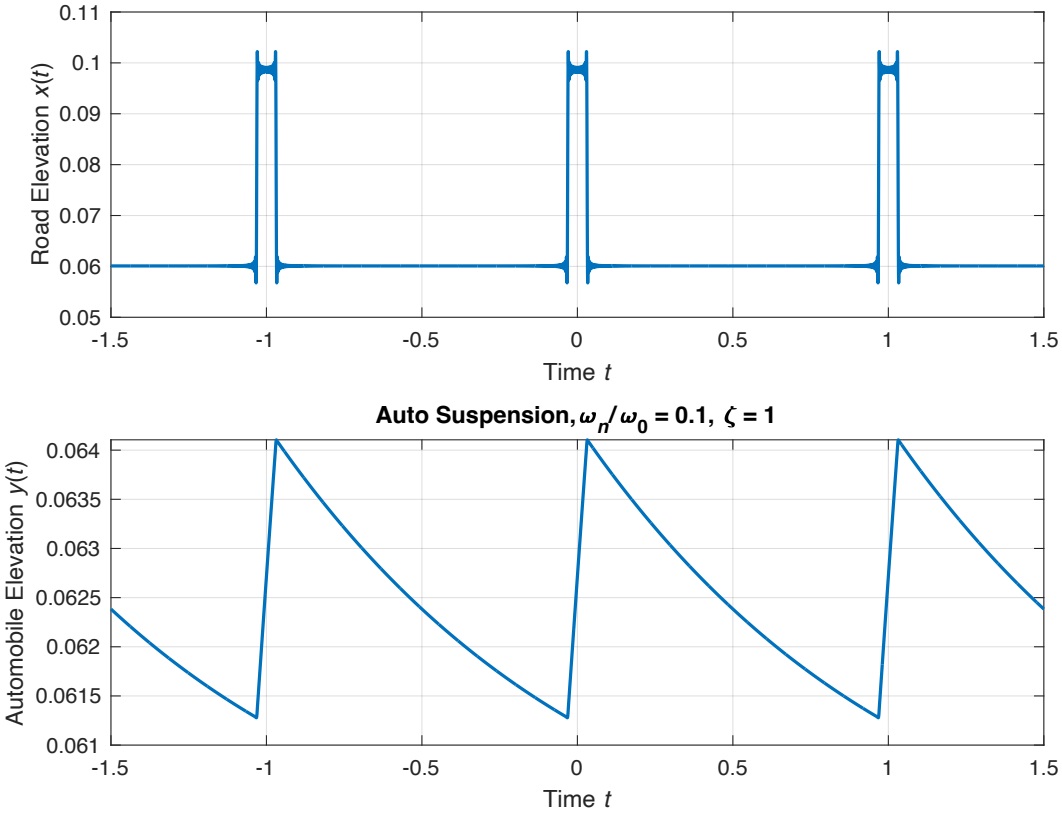

```
function H = Hautosusp(omega,omegan,zeta)
H = (omegan*omegan+2*zeta*omegan*(sqrt(-1)*omega))/((sqrt(-
1)*omega)*(sqrt(-1)*omega)+2*zeta*omegan*(sqrt(-1)*omega)+omegan*omegan);
end
```


Road Elevation x(t)
0.11
0.1
0.09
0.08
0.07
0.06
0.05
-1.5
-1
-0.5
0
0.5
1
1.5
Time t


Auto Suspension, $\omega_n/\omega_0 = 10$, $\zeta = 1$
Automobile Elevation y(t)
0.11
0.1
0.09
0.08
0.07
0.06
0.05
-1.5
-1
-0.5
0
0.5
1
1.5
Time t


Road Elevation x(t)
0.11
0.1
0.09
0.08
0.07
0.06
0.05
-1.5
-1
-0.5
0
0.5
1
1.5
Time t


Auto Suspension, $\omega_n/\omega_0 = 1$, $\zeta = 1$
Automobile Elevation y(t)
0.085
0.08
0.075
0.07
0.065
0.06
0.055
-1.5
-1
-0.5
0
0.5
1
1.5
Time t



As omega N / omega 0 ratio became smaller and smaller, the car became more and more sluggish and smoother.