```matlab
%5 task set F #4


ti=0;
tf=72;
npts=720;
T0=75;

tm=0:.1:72;
M=85-10*cos(pi*(tm-5)/12);

[out1,out2]=rk4(ti,tf,npts,T0,@differential);

maxIndoor = max(out2,[],'all'); %
indexOfmaxIndoor = find(out2==maxIndoor);%
timeOfmaxIndoor = out1(indexOfmaxIndoor);%

indexOfBroken = find(out2>=81);%
timeOfBroken = out1(indexOfBroken);%


%T(t)
figure(1);
hold on
plot(out1,out2,'blue');

title('Indoor temperature over time (F4)')
xlabel('Time (hr)','FontSize',16)
ylabel('Temperature (°F)','FontSize',16)
legend('Indoor')
xticks(0:12:72)
xlim([0 72])
grid on
grid minor
hold off

%M(t)
figure(2);
hold on
plot(tm,M,'blue');

title('Outdoor temperature over time (F4)')
xlabel('Time (hr)','FontSize',16)
ylabel('Temperature (°F)','FontSize',16)
legend('Outdoor')
xticks(0:12:72)
xlim([0 72])
grid on
grid minor
hold off
```
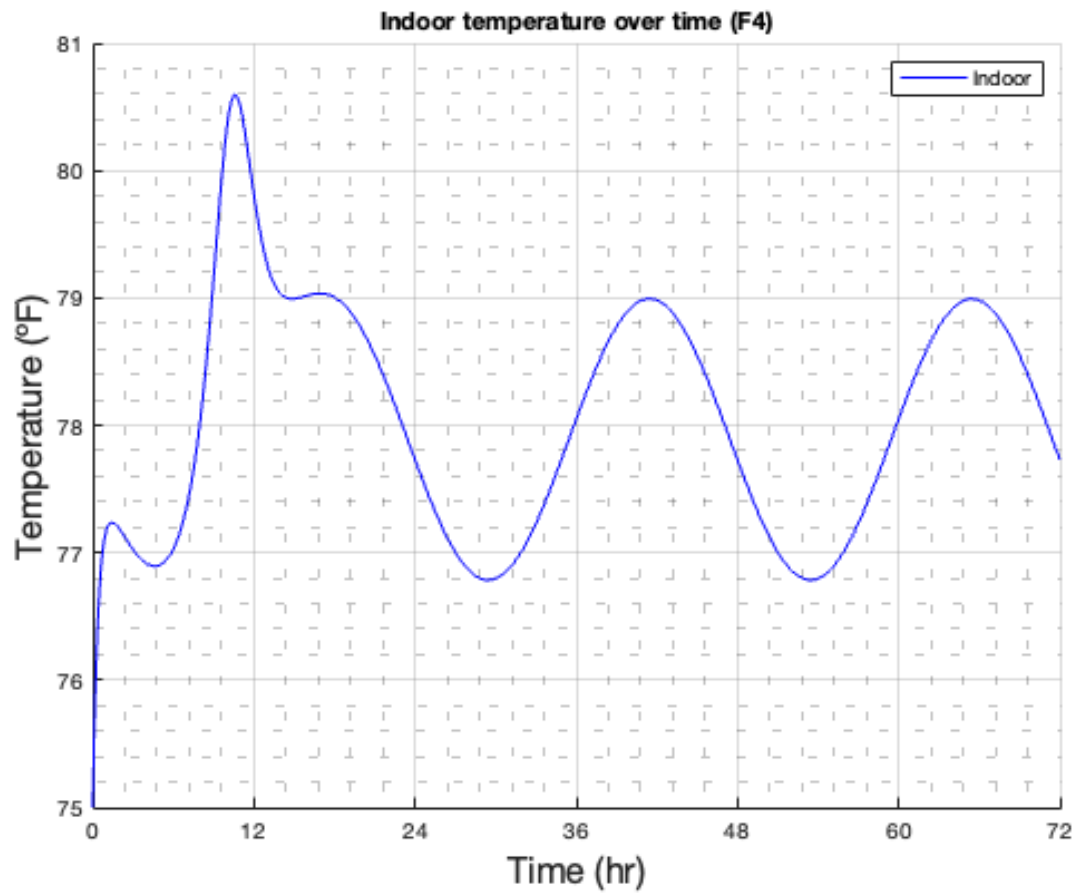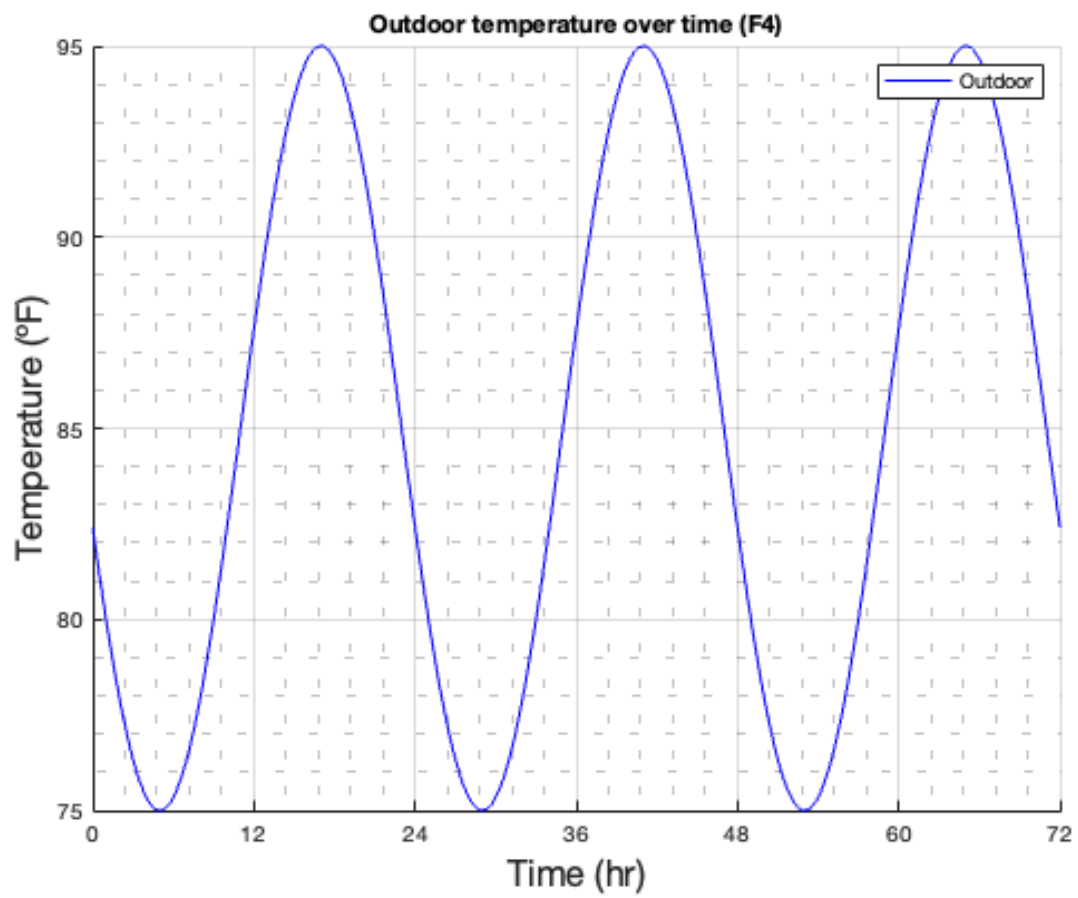
```
function f = differential(t,T);
f=0.25*(85-10*cos(pi*(t-5)/12)-T)+7*sech((3/4)*(t-10))+2*(77-T);
end
```

Indoor temperature over time (F4)

Outdoor temperature over time (F4)

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