```matlab
Ta = 250;
a = 4.04*10^(-12);
t_f = 0;
t_e = 10;
step = 1;
n = 10;

t_values = zeros(1,n+1);
t_values(1) = 0;
T_values = zeros(1,n+1);
T_values(1) = 2500;

%Euler method

for i = 1:n
    dT_dt = -a*(T_values(i)^4);
    T_values(i+1) = T_values(i) + dT_dt;
    t_values(i+1) = t_values(i) + 1;
end

T_R = zeros(11);
T_R(1) = 2500;

%Runge-Kutta second method

for i = 2:11
    k1 = -a*(T_R(i-1)^4-Ta^4);
    k2 = -a*((T_R(i-1) + 0.5 * k1)^4 - Ta^4);
    T_R(i) = T_R(i-1) + k2;
end

T_RR = zeros(11);
T_RR(1) = 2500;
%Runge_Kutta Forth method
for i = 2:11
    k1 = -a*(T_RR(i-1)^4 - Ta^4);
    k2 = -a*((T_RR(i-1) + 0.5 *k1)^4 - Ta ^4);
    k3 = -a*((T_RR(i-1) + 0.5 * k2)^4 - Ta ^ 4);
    k4 = -a*((T_RR(i-1) + k3)^4 - Ta^4);
    T_RR(i) = T_RR(i-1) + (1/6) * (k1 + 2*k2 + 2*k3 + k4);
end
```

```matlab
%results
disp('T in 5s, 10s with Euler method')
disp(T_values(5));
disp(T_values(10));
disp('T in 5s, 10s with 2nd Runge-Kutta method');
disp(T_R(5));
disp(T_R(10));
disp('T in 5s, 10s with 4nd Runge_Kutta method');
disp(T_RR(5));
disp(T_RR(10));

%plotting

plot(t_values,T_R,'-g',t_values, T_values,'-r',t_values,T_RR,'-y');
xlabel('Temp(s');
ylabel('Temp(k');
title('reyhane esmailizadeh 810800004')
```

```
T in 5s, 10s with Euler method
   2.0404e+03

   1.7647e+03

T in 5s, 10s with 2nd Runge-Kutta method
   2.0742e+03

   1.7965e+03

T in 5s, 10s with 4nd Runge_Kutta method
   2.0717e+03

   1.7945e+03
```
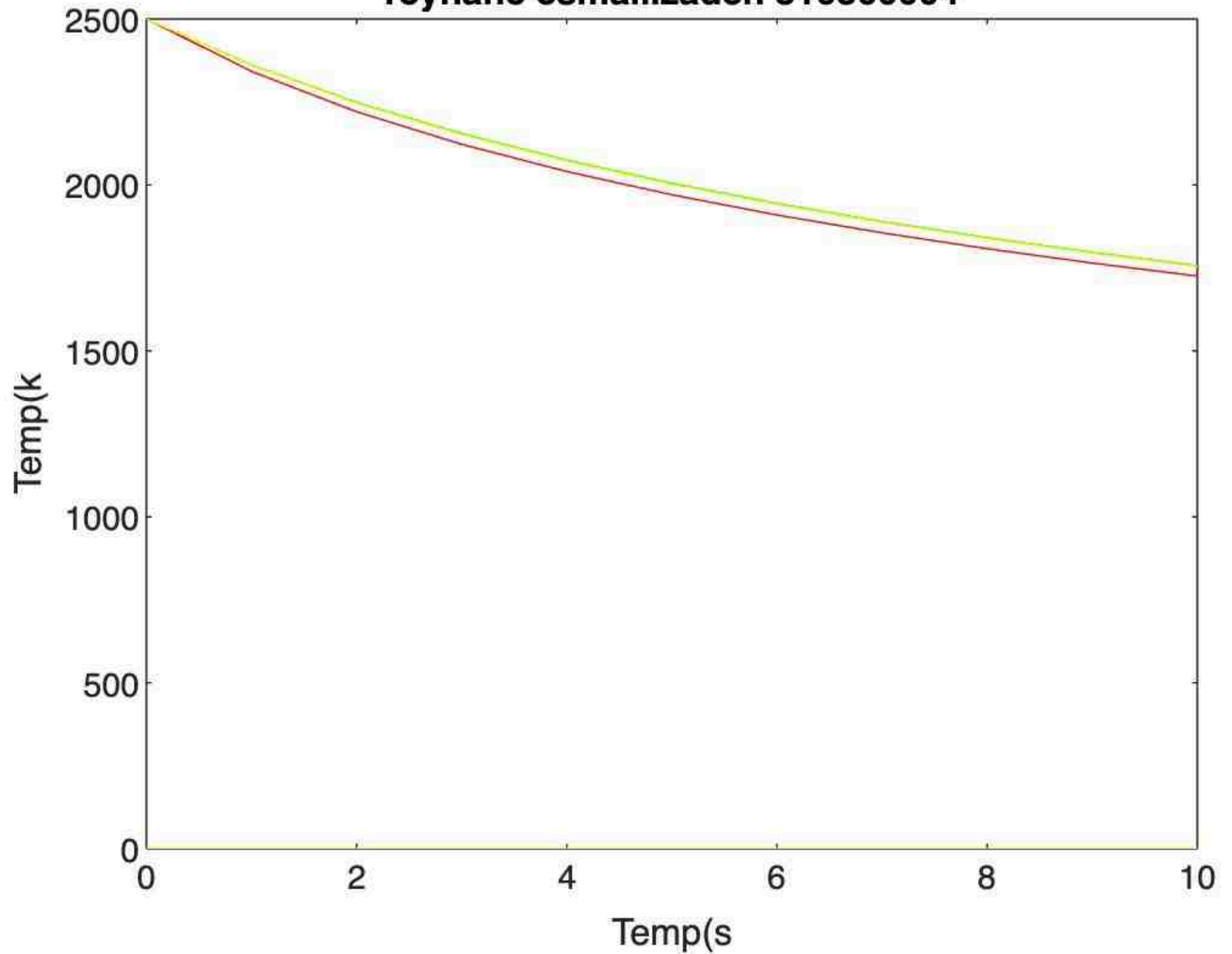
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