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%%%%%%%%% Math 430 - Differential equations - Homework 1 %%%%%%%%%%
%
% MONTES Virginie
% Due sept. 27
%
%%Problem 1:
%
%
%At the time that the Unit Socorro CSI found the body was at the
%temperature of 88 degrees F, and the room at a temperature of 70 degrees
°F. Theses parameters are the fundamental ones to determine when the murder
%took place and the body or room variation of temperature after doesn't
%change the type of equation that we use to determine the time of the
%murder, but may modify the equation for the evolution of the temperature
%after the found of the body. So we assume to have a differential equation
%of the type:
%dT = -k*T*dt, with T the temperature, t the time in hours and k a constant
%which depends on the mass of the body (k = 1.2815/(M^0.625)-0.0284). We
%suppose a mass of 70 kg for the body, so we have k = 0.0617.

global k

% Parameter
k = 0.0617;

% Final time
tfinal = 10;

% initial condition of temperature
T0 = 98.6;

[t,y] = ode45('tempbodyfct', 0, tfinal, [T0]); % Resolution
y1 = y(:,1);

plot(t,y1) %We plot the temperature in a function of time
xlabel ('time (in hour)');
ylabel ('temperature of the body (in degrees F)');
title ('Cooling of a body in function of time');

%At t=0, when the murder was committed, the body was still at the normal
%temperature of 98.6 degree F, and start to decrease after.

y1',t'

%We can read that at T=88 degrees F the corresponding time is t=1.75. So
%when the police discovered the body it passed 1h45 after the death.

Warning: Obsolete syntax. Use ode45(fun,tspan,y0,...) instead.

ans =

Columns 1 through 9

    98.6000    97.0908    95.6046    94.1412    92.7003    91.2813    89.8841    88.5083

Columns 10 through 18

    85.8195    84.5059    83.2124    81.9387    80.6845    79.4495    78.2334    77.0359

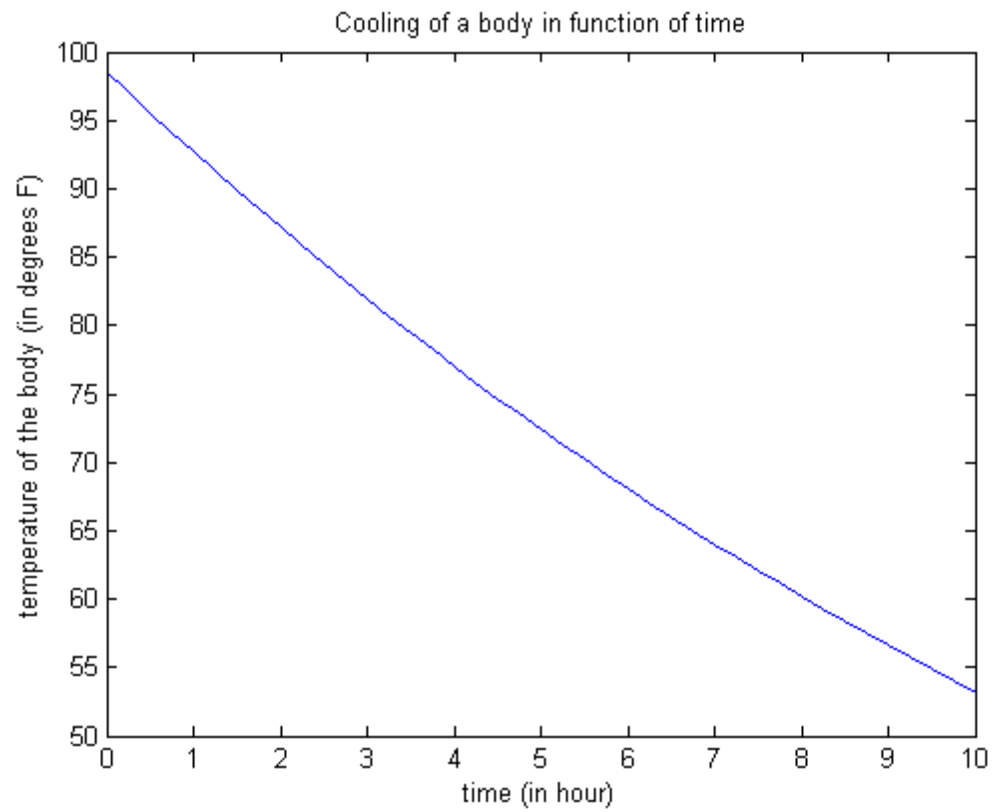
Columns 19 through 27

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74.6956	73.5523	72.4264	71.3178	70.2262	69.1513	68.0928	67.0505
Columns 28 through 36							
65.0136	64.0184	63.0385	62.0736	61.1235	60.1879	59.2666	58.3594
Columns 37 through 41							
56.5865	55.7204	54.8675	54.0277	53.2007			

ans =

Columns 1 through 9							
0	0.2500	0.5000	0.7500	1.0000	1.2500	1.5000	1.7500
Columns 10 through 18							
2.2500	2.5000	2.7500	3.0000	3.2500	3.5000	3.7500	4.0000
Columns 19 through 27							
4.5000	4.7500	5.0000	5.2500	5.5000	5.7500	6.0000	6.2500
Columns 28 through 36							
6.7500	7.0000	7.2500	7.5000	7.7500	8.0000	8.2500	8.5000
Columns 37 through 41							
9.0000	9.2500	9.5000	9.7500	10.0000			



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