IALP 2011 – Octave TP6-solutions

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MIEET 1º ano

Exercise 2:

```
a = [
1 1 1
1 -1 0
2 2 1];
b = [
2
2
2];
sol = a\b
```

Exercise 3:

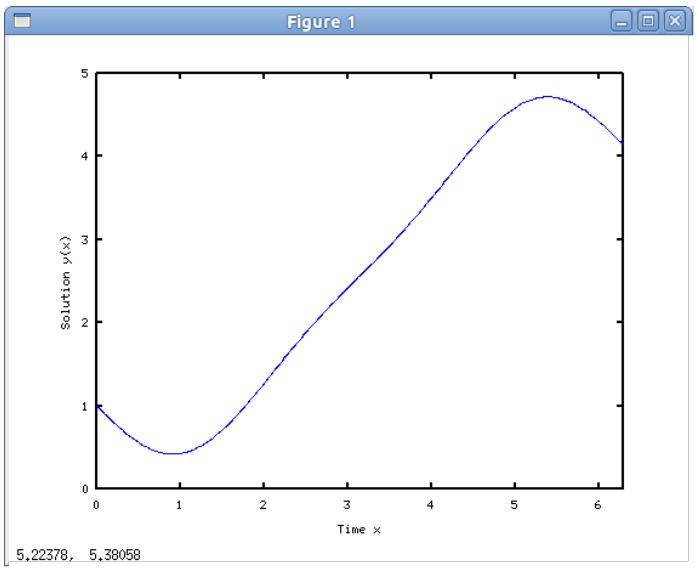
file `f.m`:

```
function dydx = f(y,t)
 dydx = (sin(t))^2-cos(t);
endfunction
```

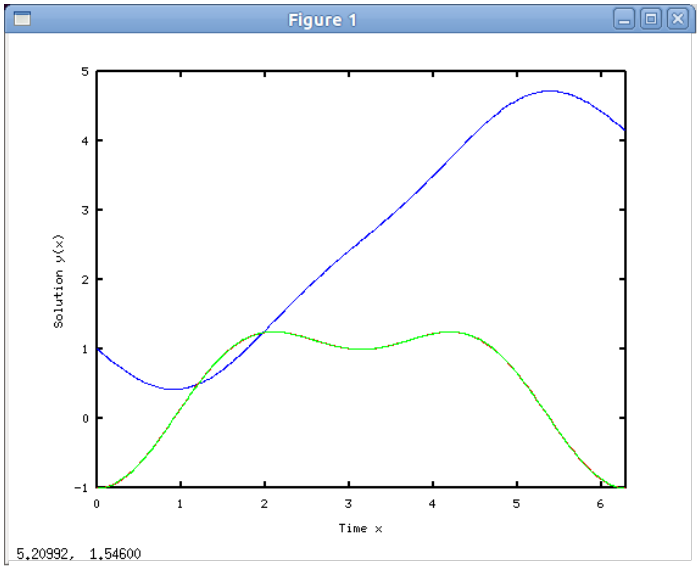
main program:

```
clear all;
y0 = 1;
x = linspace(0, 2*pi, 300);
ysol = lsode("f", y0, x);
% for some reason the solution is put in a horizontal array
% instead of vertical. Transpose it:
y = ysol';
hold off;
plot(x, y);

% pretty plot axis scales:
axis tight
ylim auto
xlabel('Time x');
ylabel('Solution y(x)');
```




```
%% b:
hold on
yanal = sin(x).^2 - cos(x);
plot(x, yanal, 'r-');
ynum = diff(y) ./ diff(x);
plot(x(1:299)+(x(2)-x(1))/2, ynum, 'g-');
% (x(2)-x(1))/2 is to shift the curve to the right slightly
% to put derivative between two points
```



Note: difference between analytical derivative (red) and numerical derivative (green) barely visible.