Introduction to ODE's (0B)

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12/29/14

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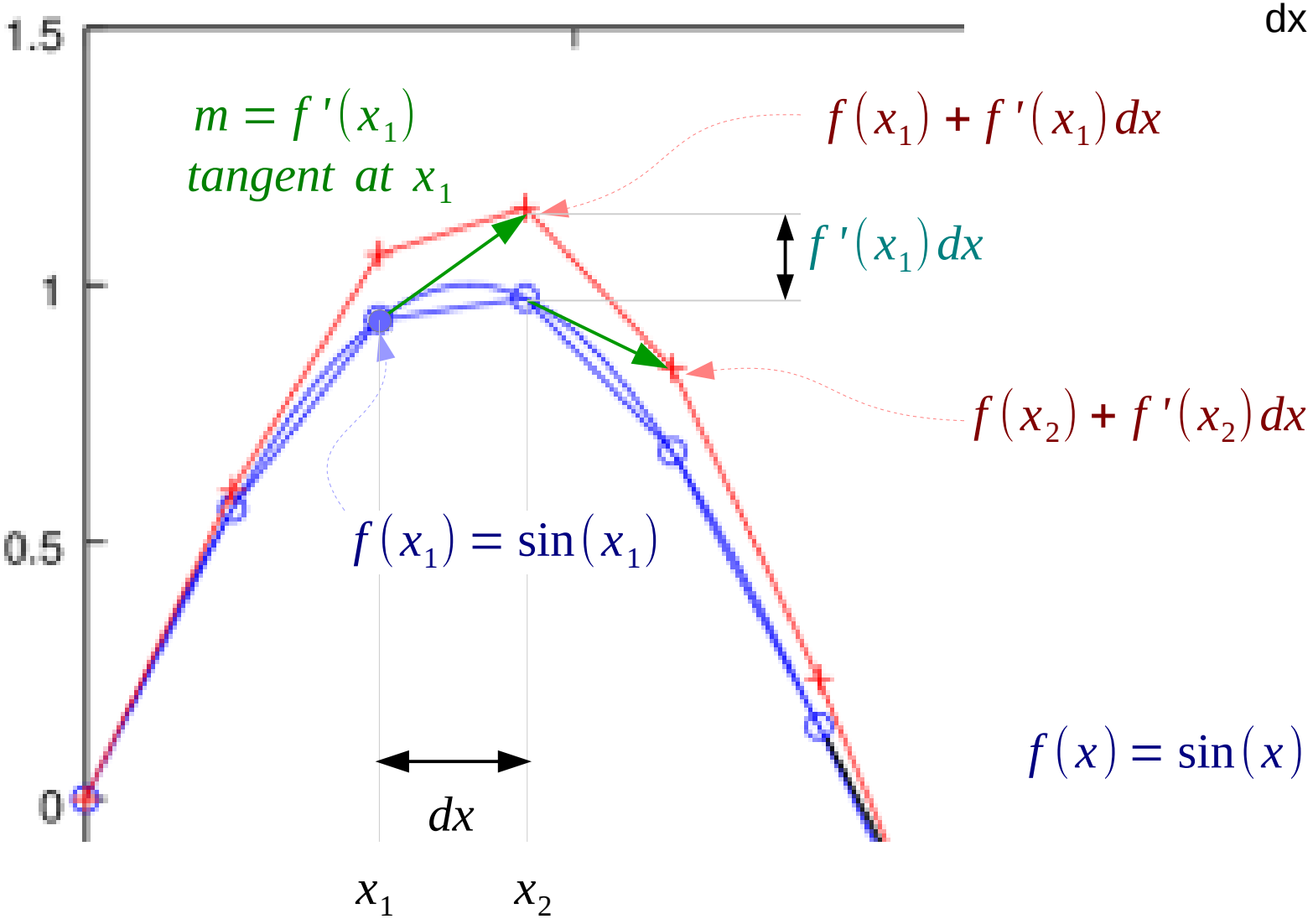
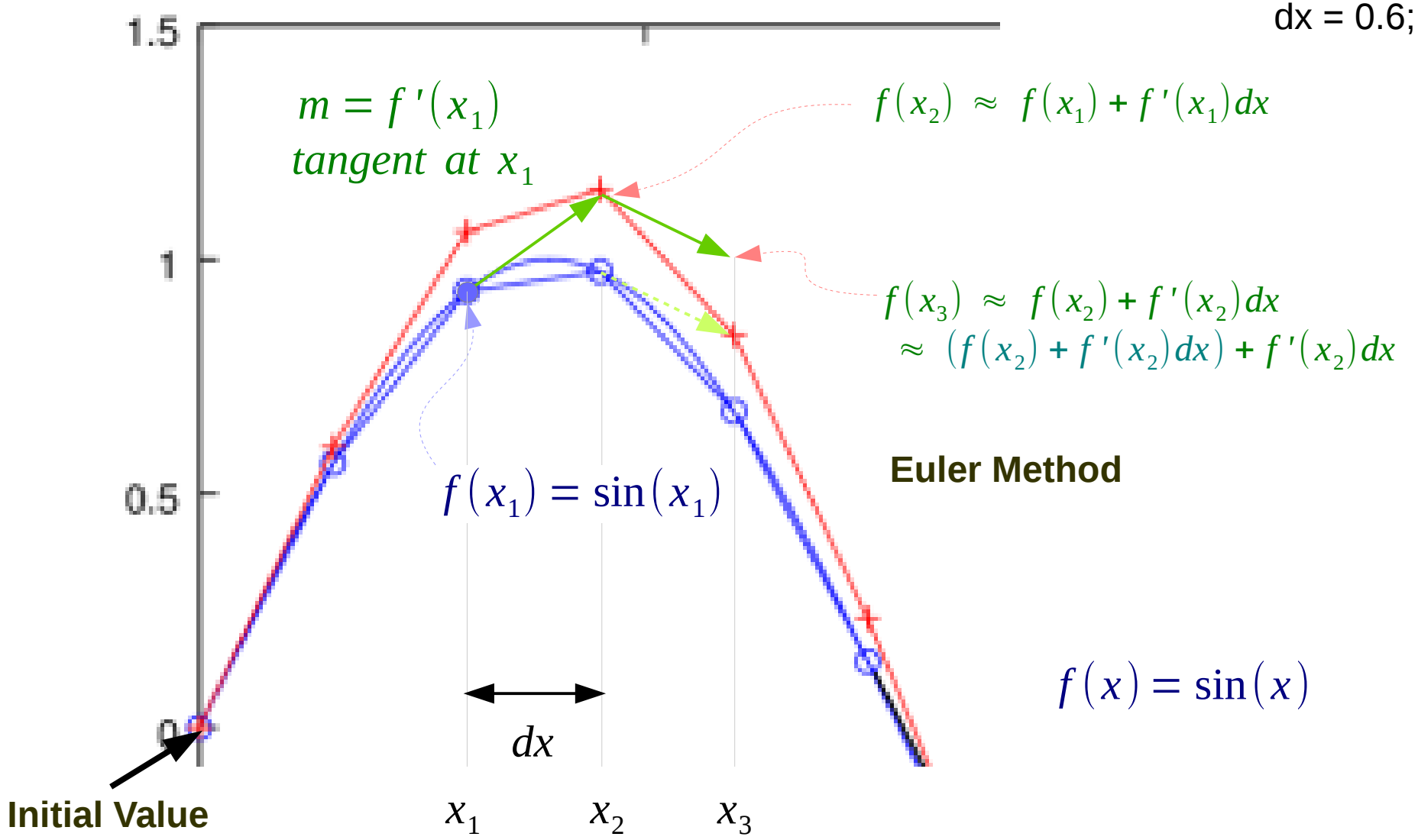
This document was produced by using OpenOffice and Octave.

Derivatives and Differentials (large dx)

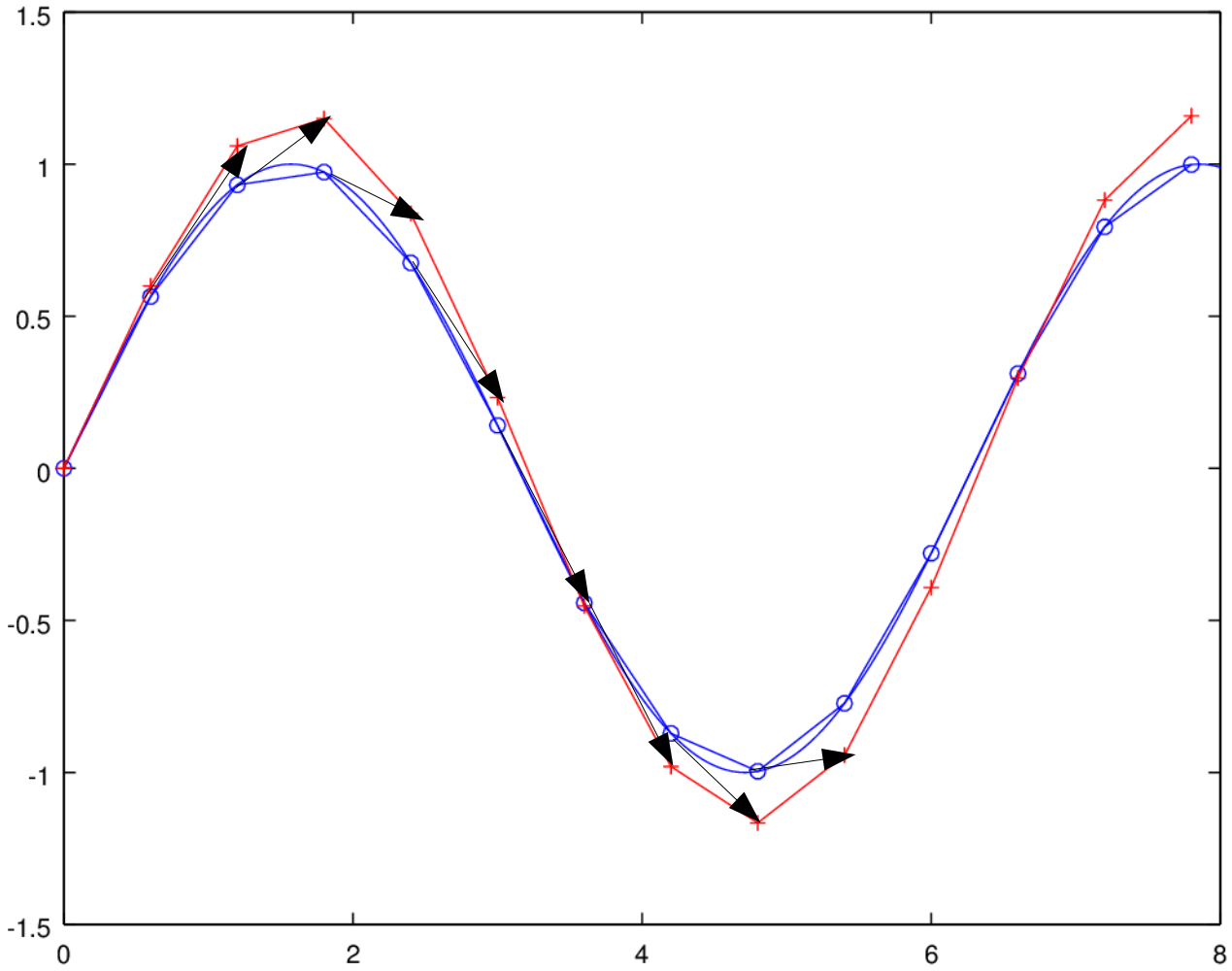
dx = 0.6;



Euler Method of Approximation (large dx)

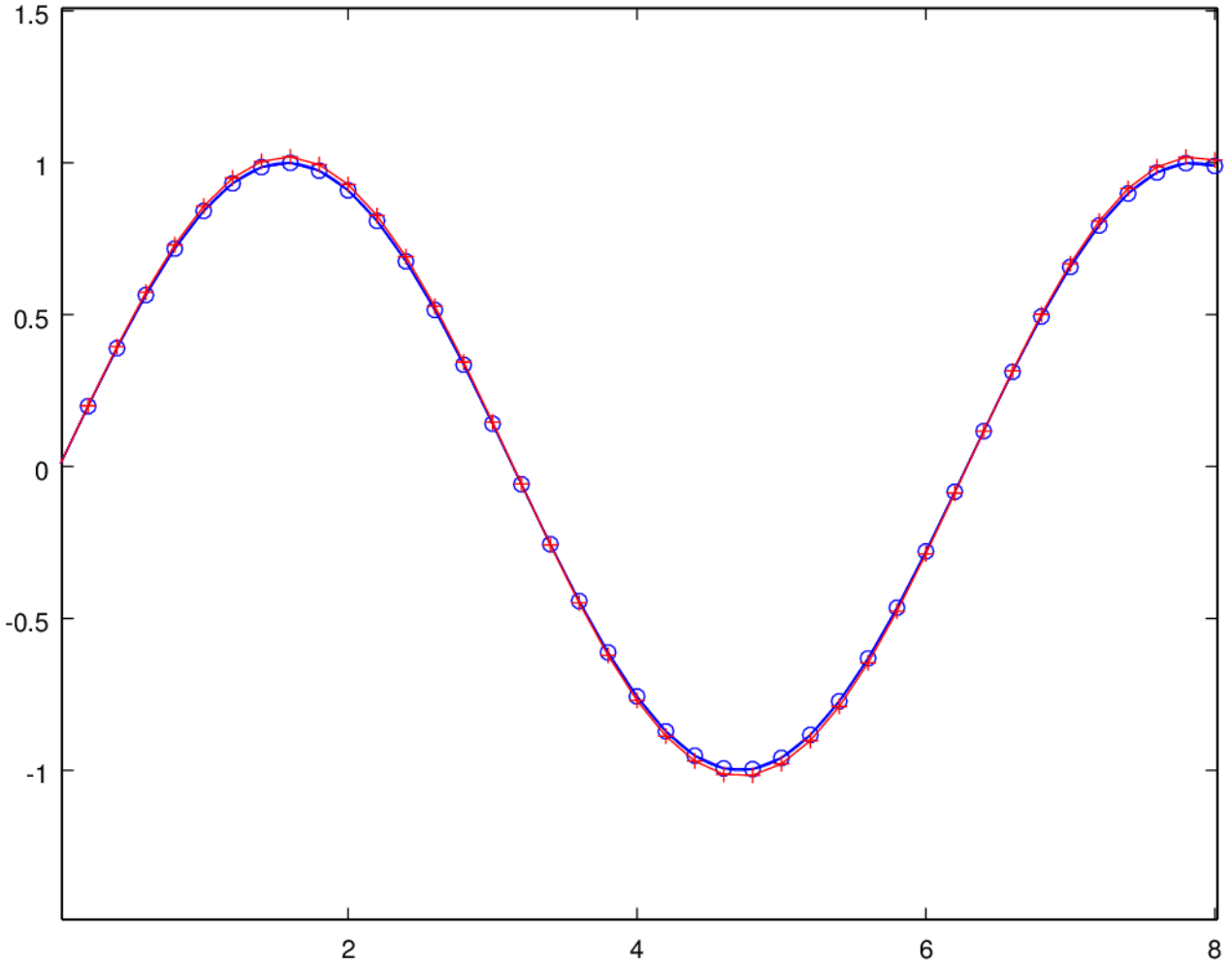


Derivatives and Differentials (large dx)



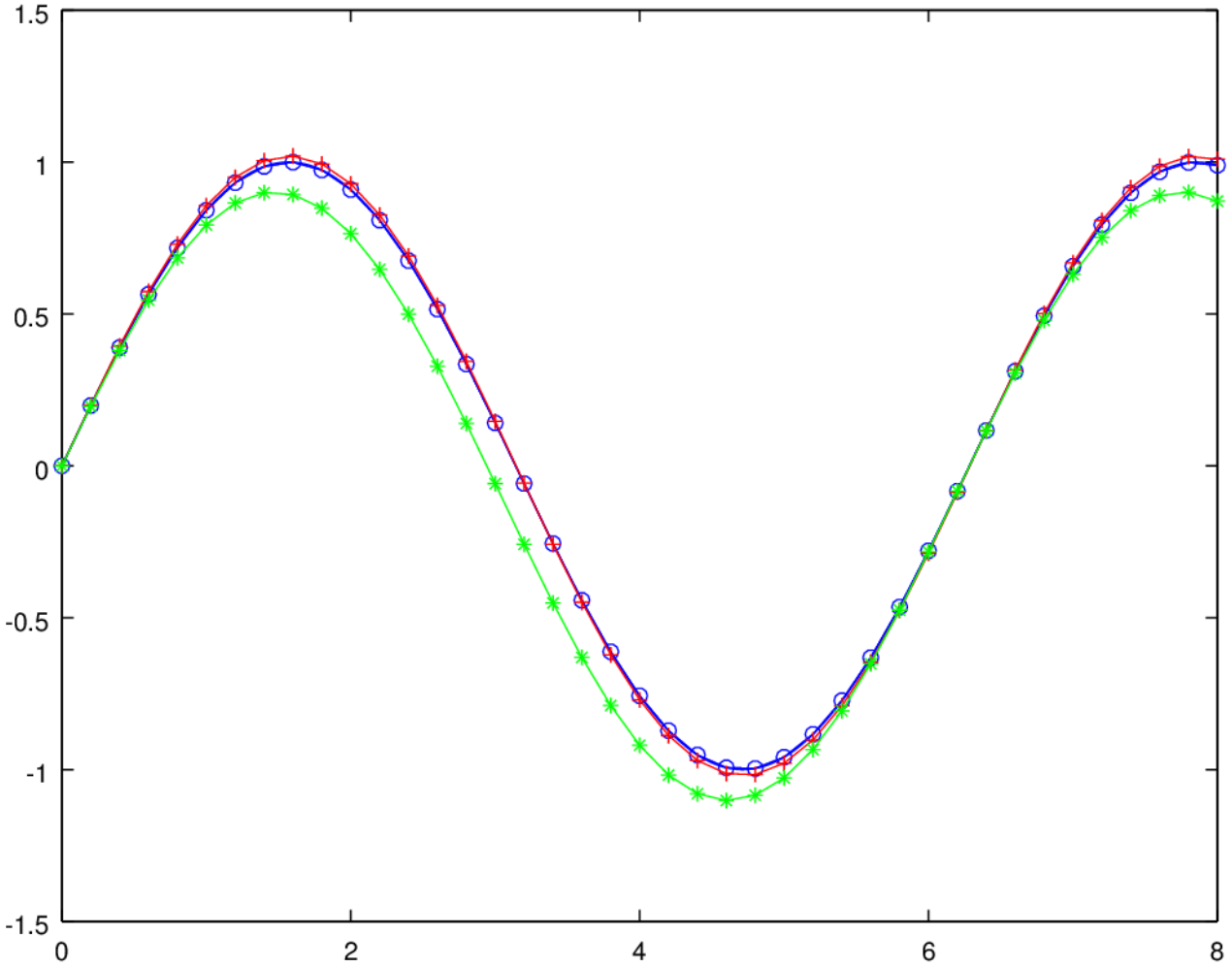
dx = 0.6;

Derivatives and Differentials (small dx)



dx = 0.2;

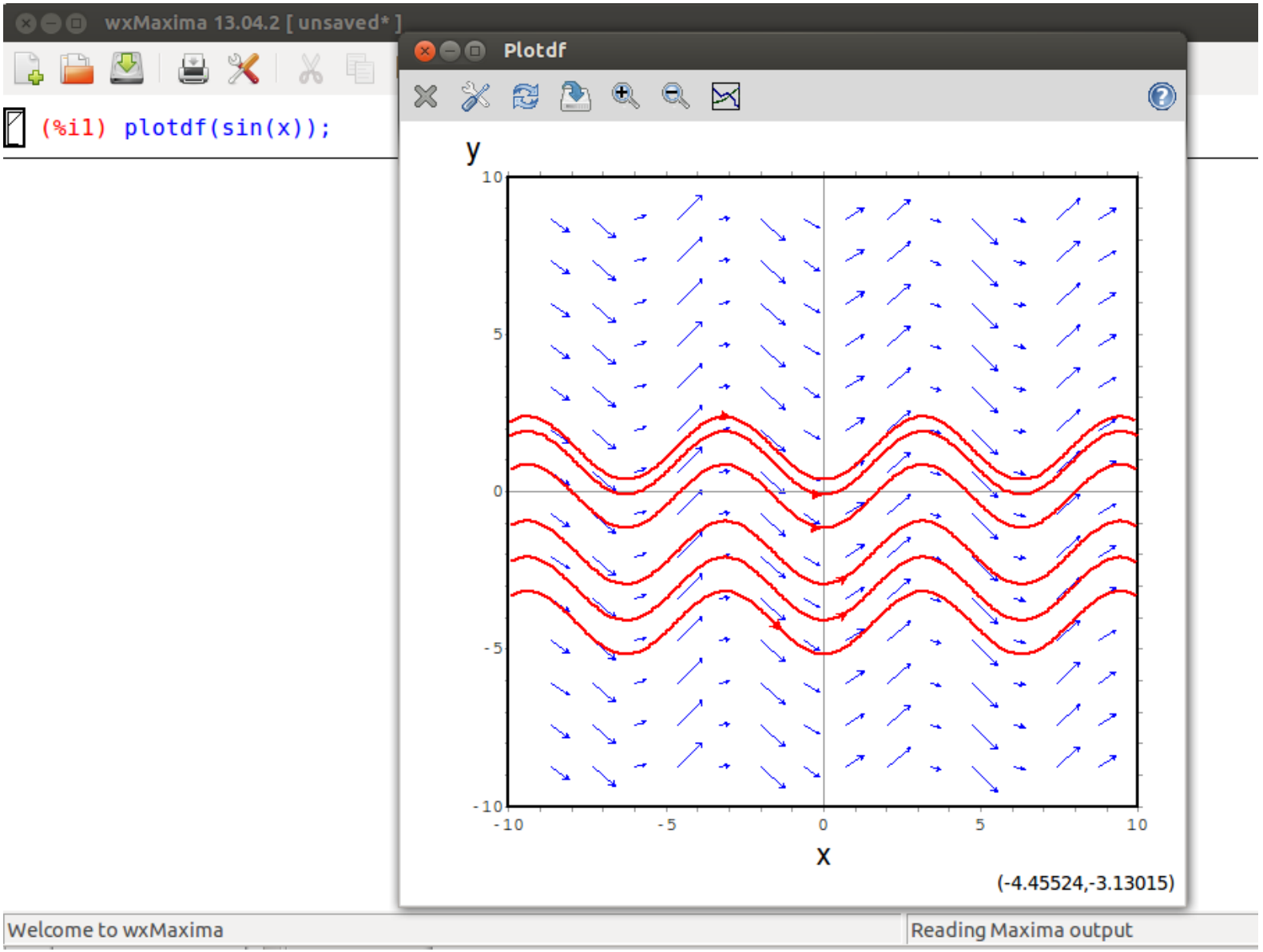
Euler's Method of Approximation



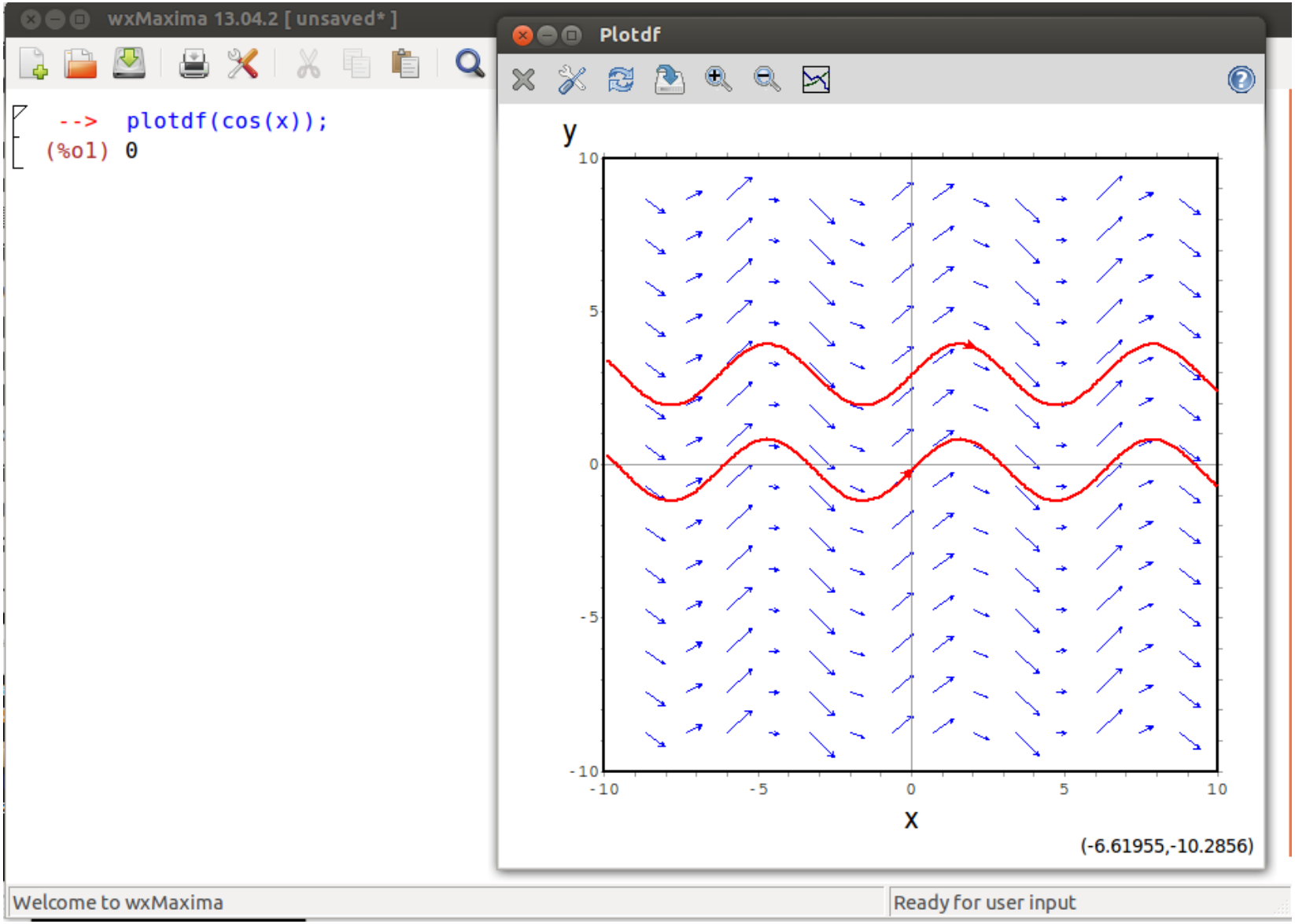
Octave Code

```
clf; hold off;
dx = 0.2;

x = 0 : dx : 8;
y = sin(x);
plot(x, y);
t = sin(x) + cos(x)*dx ;
y1 = [y(1), t(1:length(y)-1)];

y2 = [0];
y2(1) = y(1);
for i=1:length(y)-1
  y2(i+1) = y2(i) + cos((i)*dx)*dx;
endfor

hold on
t = 0:0.01:8;
plot(t, sin(t), "color", "blue");
plot(x, y,   "color", 'blue',  "marker", 'o');
plot(x, y1,  "color", 'red',   "marker", '+');
plot(x, y2,  "color", 'green',  "marker", '*');
```

Direction Field (1)



Direction Field (2)



References

[1] http://en.wikipedia.org/
[2] M.L. Boas, “Mathematical Methods in the Physical Sciences”
[3] E. Kreyszig, “Advanced Engineering Mathematics”
[4] D. G. Zill, W. S. Wright, “Advanced Engineering Mathematics”