

# Introduction to ODE's (0B)

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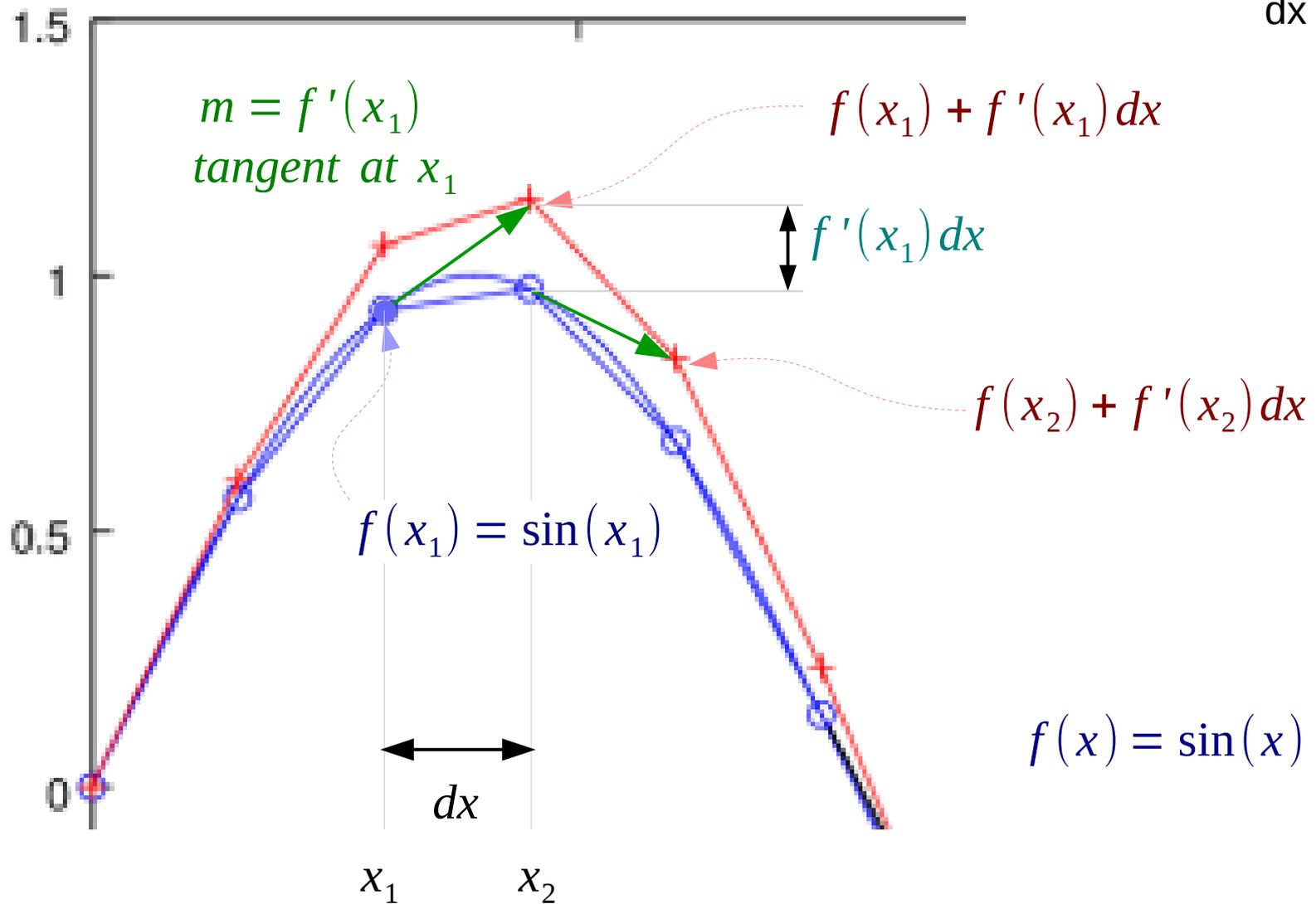
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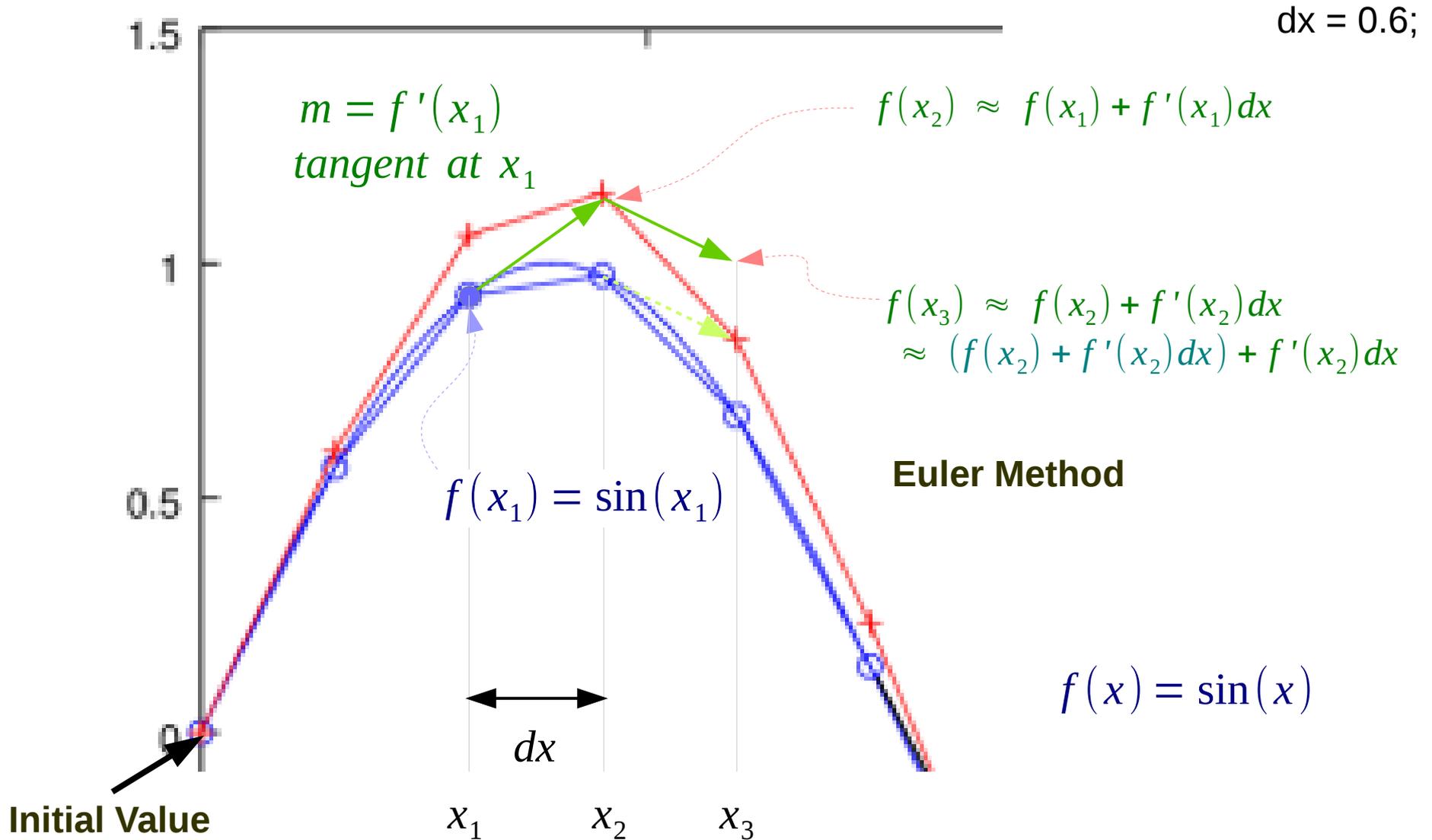
Please send corrections (or suggestions) to [youngwlim@hotmail.com](mailto:youngwlim@hotmail.com).

This document was produced by using OpenOffice and Octave.

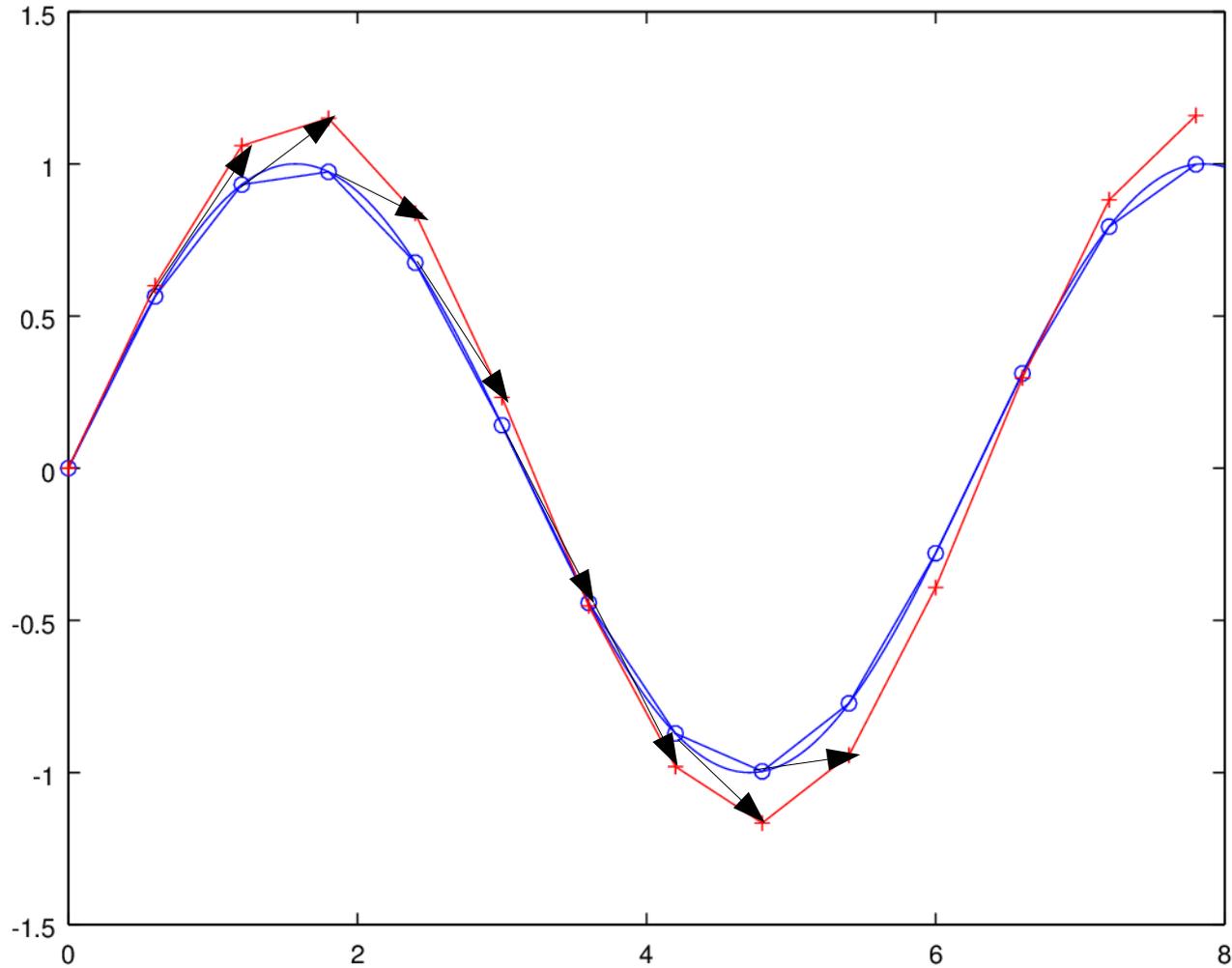
# Derivatives and Differentials (large dx)



# Euler Method of Approximation (large dx)

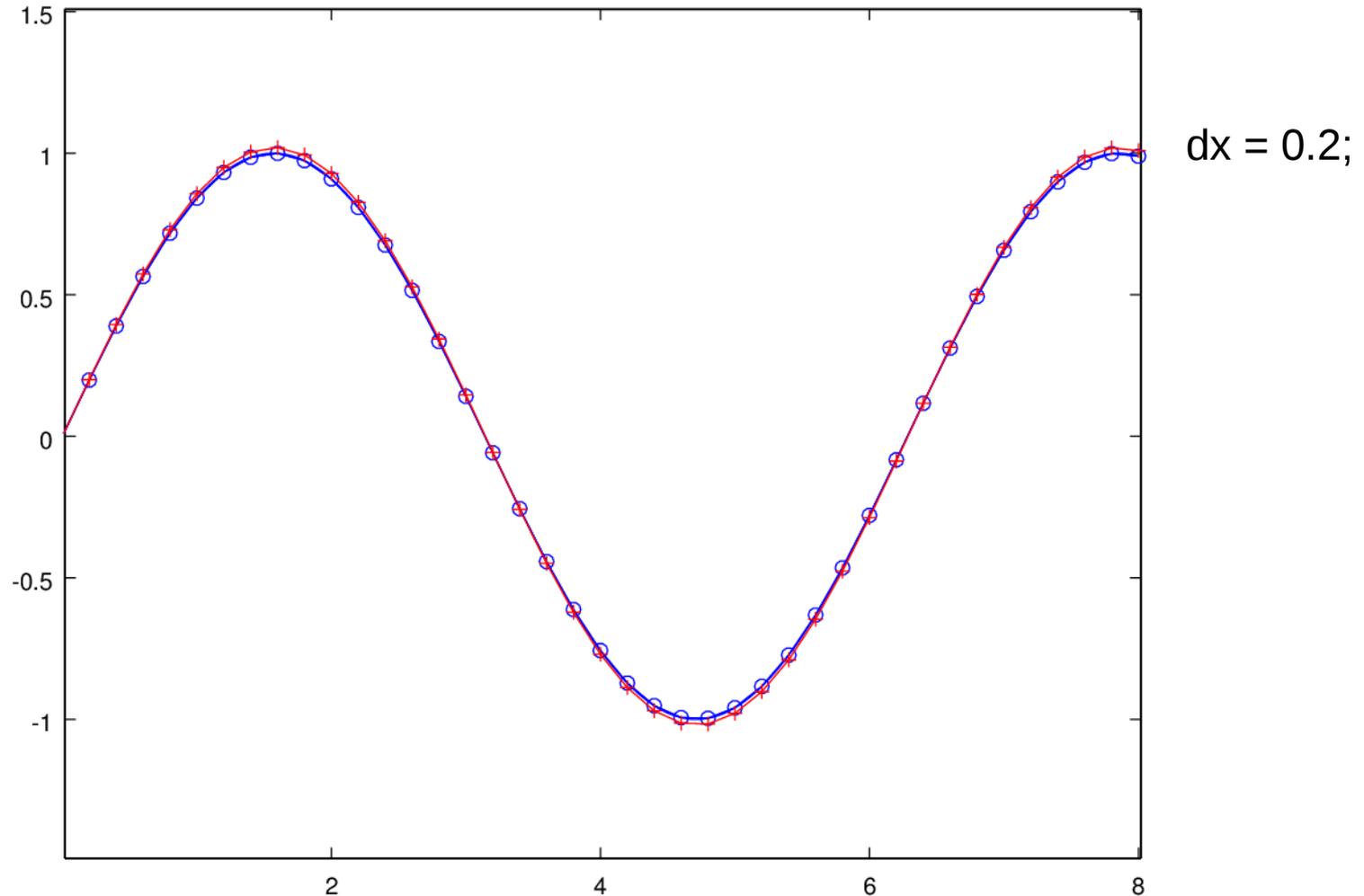


# Derivatives and Differentials (large dx)

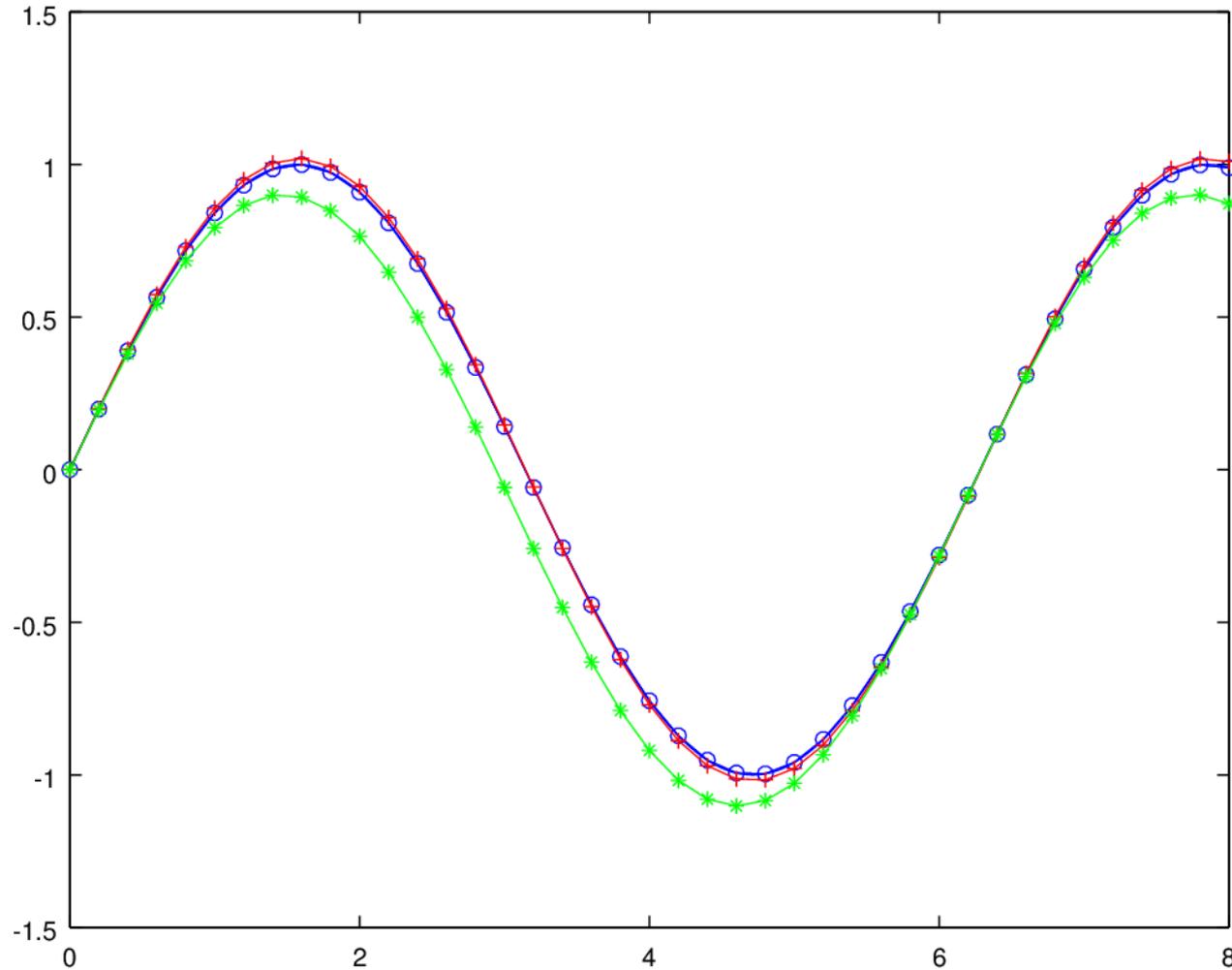


$dx = 0.6;$

# Derivatives and Differentials (small dx)



# Euler's Method of Approximation



# Octave Code

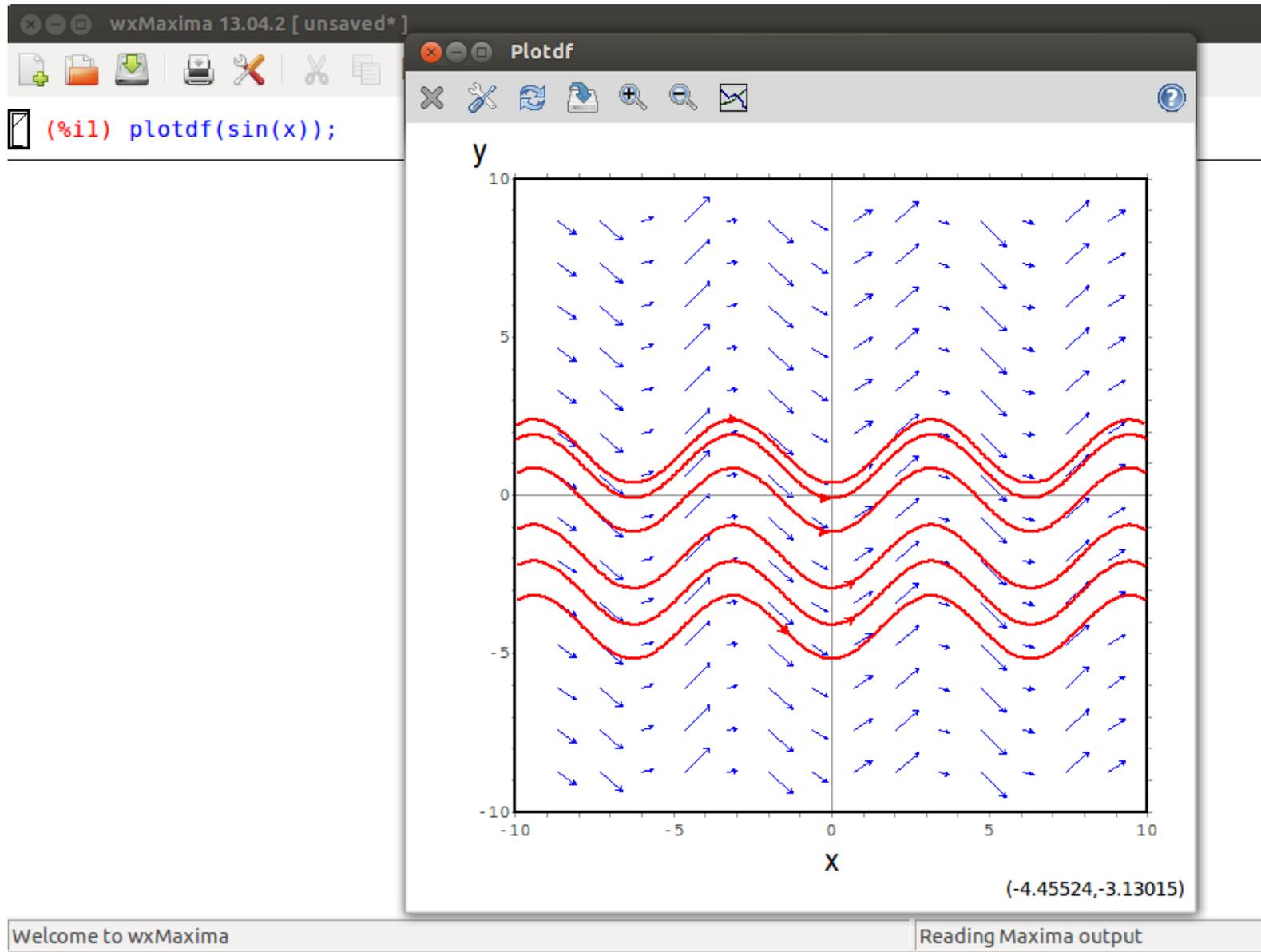
```
clf; hold off;
dx = 0.2;

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

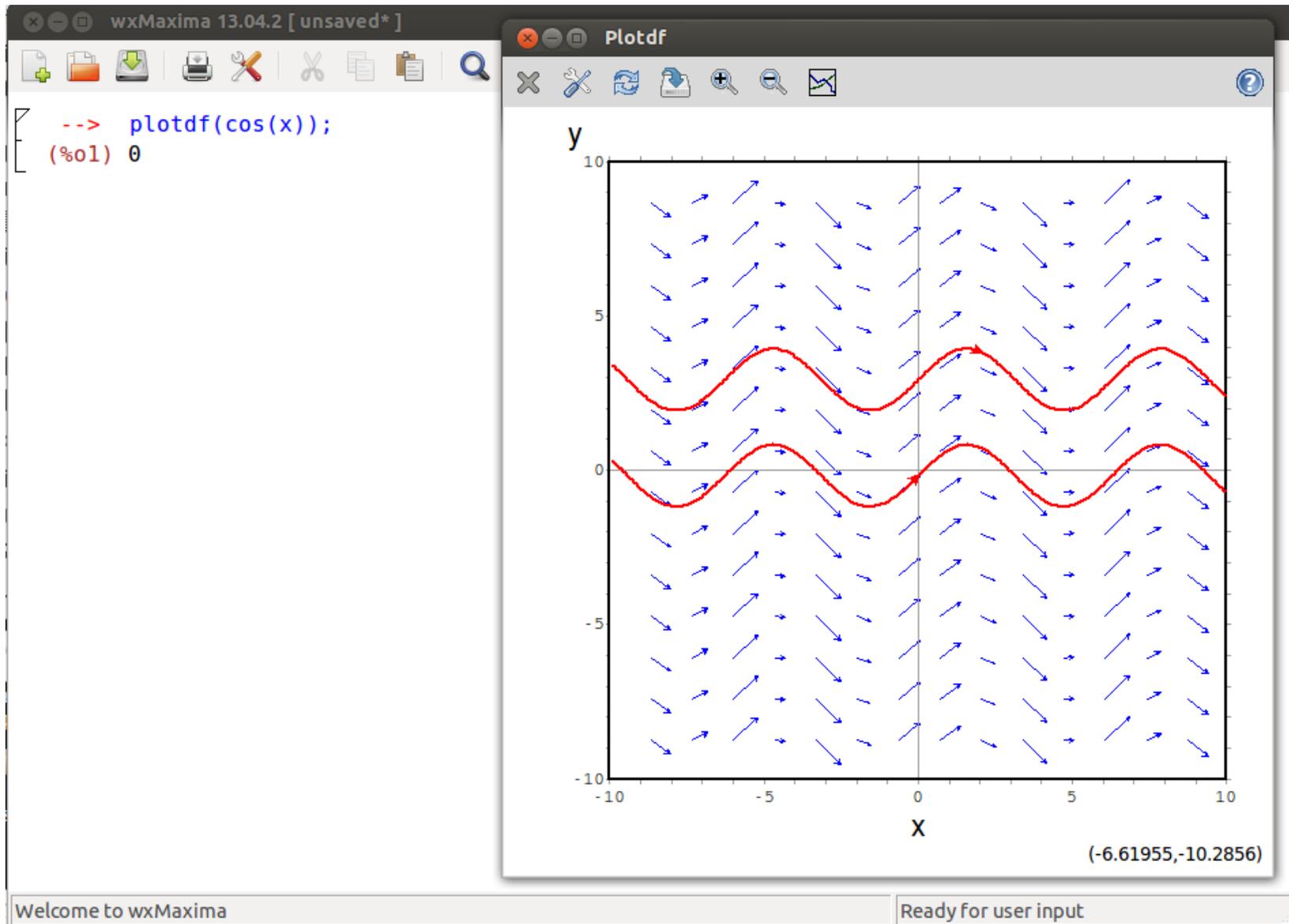
y2 = [0];
y2(1) = y(1);
for i=1:length(y)-1
    y2(i+1) = y2(i) + cos((i)*dx)*dx;
endfor

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”