Lab instructions

Week 09

Introduction to Programming
ECS 102, 2018-19 Semester II

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use_macros.c

(a) Define square(x) as x*x. Call square(2) and square(2+3). Explain your answers. Correct your definition.

(b) Define the following properly and test.

  (a) abs(x)

  (b) cube(x) using square(x) as nested macro

  (c) sind(x) that takes input as degree and returns “sin” value

  (d) max(a,b)

  (e) A nested macro that gives the minimum of three values

Newton_Raphson.c

Write an iterative program to calculate the square root of a given number x. You should start with a guess g and iterate with the following replacement of g

$$g_{i+1} \rightarrow g_i - \frac{f(g_i)}{f'(g_i)}$$

until the absolute value of

$$g_i * g_i - x \geq 1e - 6.$$

$f(g) = g^2 - x$, and $f'(g)$ is the derivative of $f(g)$.

What value of the initial guess you would like to avoid?

Use a maximum number of allowed iterations.

fitting.c

Write a program for fitting a straight line through a set of points (x_i, y_i), $i = 1, \dots, n$.

The straight line equation is

$$y = m * x + c$$

and the values of m and c are given by

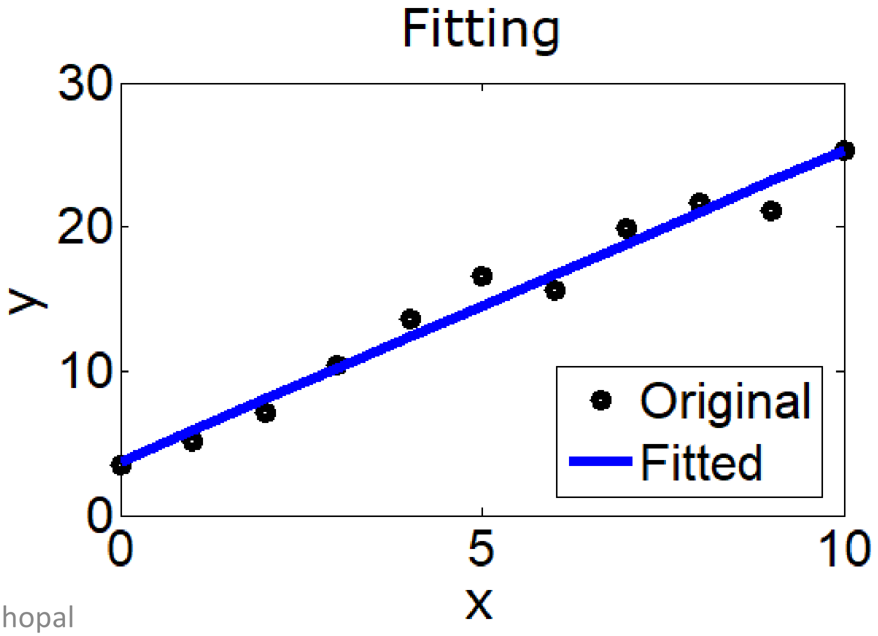
$$m = \frac{n \ \sum_1^n x_i y_i - \sum_1^n x_i \sum_1^n y_i}{n \sum_1^n x_i^2 - (\sum_1^n x_i)^2}$$

$$c = \frac{1}{n}\left(\sum_1^n y_i - m \sum_1^n x_i\right).$$

You don't have to plot

Take some approximate values of (x_i, y_i)

This is called least squares fitting


Fitting
y
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