

# Analisis Numerik (Pendahuluan)

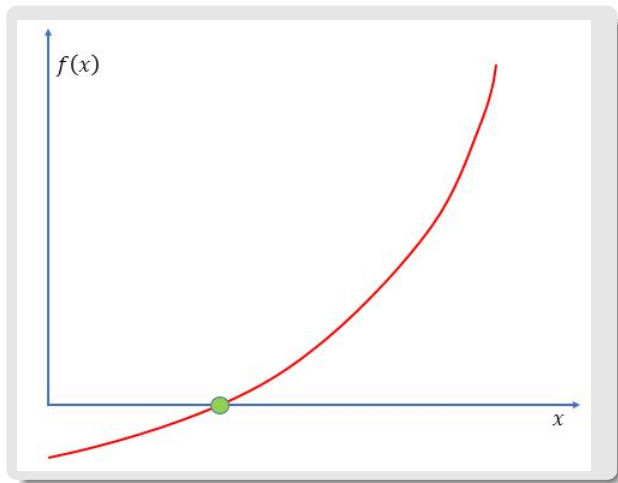
M. Jamhuri

August 26, 2013

- 1 Materi
  - Akar Persamaan
  - Sistem Persamaan Linier
  - Optimization
  - Aproksimasi Fungsi
  - Turunan
  - Integral
  - Persamaan Differensial Biasa
  - Persamaan Differensial Parsial

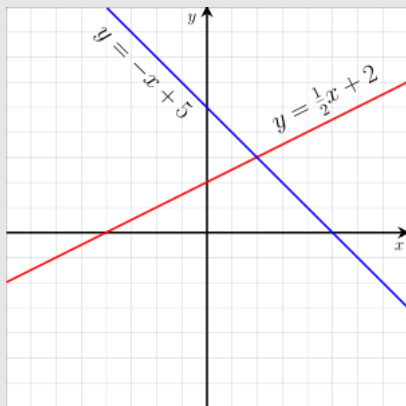
- 2 Buku Pegangan

# Akar Persamaan



Selesaikan  $f(x) = 0$  untuk  $x$

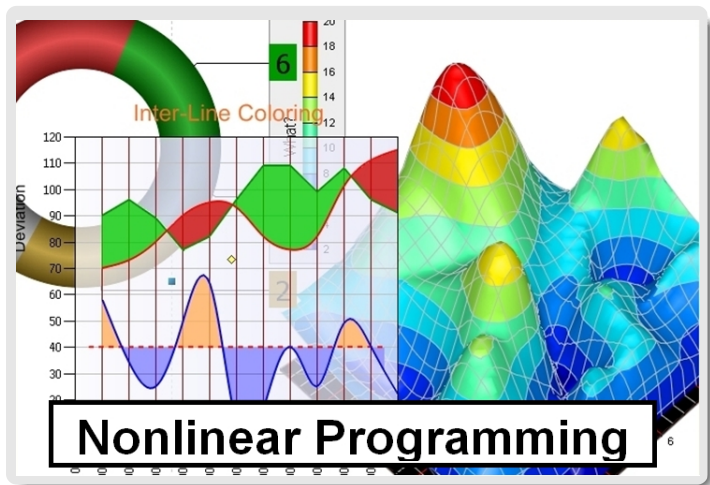
## Sistem persamaan linier



Diberikan nilai-nilai  $a$  dan  $c$ , tentukan nilai-nilai  $x$  dari sistem berikut

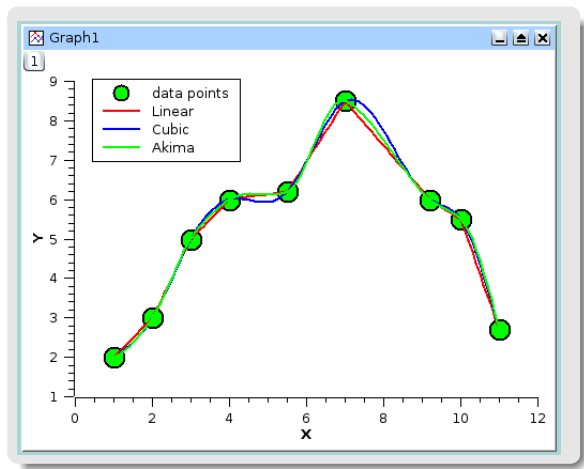
$$a_{11}x_1 + a_{12}x_2 = c_1$$

$$a_{21}x_1 + a_{22}x_2 = c_2$$

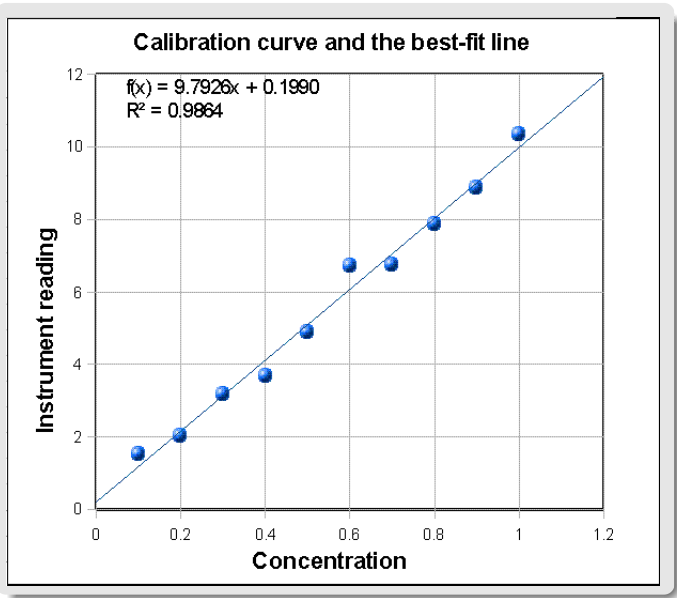


Tentukan nilai  $x$  yang menghasilkan nilai optimum untuk  $f(x)$

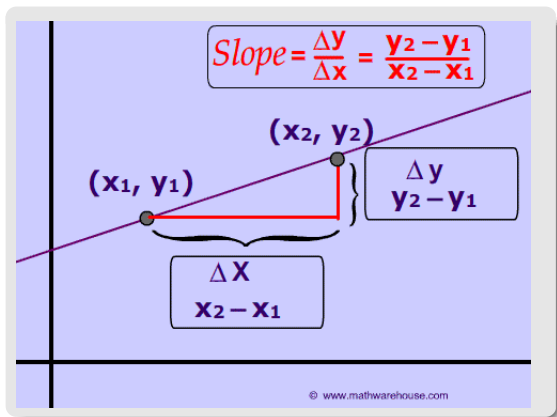
# Aproksimasi Fungsi



$$\cos x \approx 1 - \frac{1}{2!}x^2 + \frac{1}{4!}x^4 - \dots + (-1)^{\frac{n}{2}} \frac{1}{n!}x^n$$



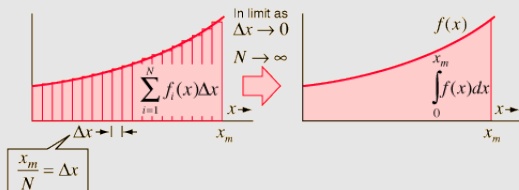
$$y \approx \alpha_0 + \alpha_1 x$$



$$f'(x) \approx \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$



## Sum becomes Integral

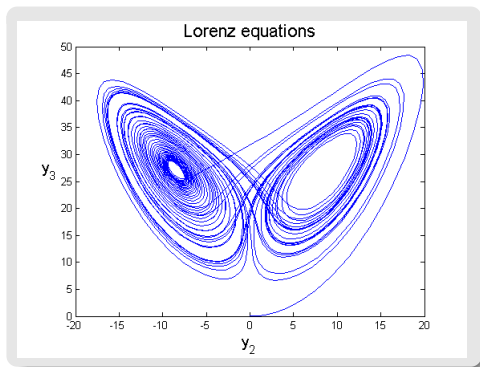


$$\text{Area} = \int_0^{x_m} f(x)dx = \lim_{\Delta x \rightarrow 0} \sum_{i=1}^N f_i(x)\Delta x$$

$$I \approx \frac{\Delta y}{\Delta x} = \int_a^b f(x) dx$$

Tentukan luas daerah yang berada dibawah kurva

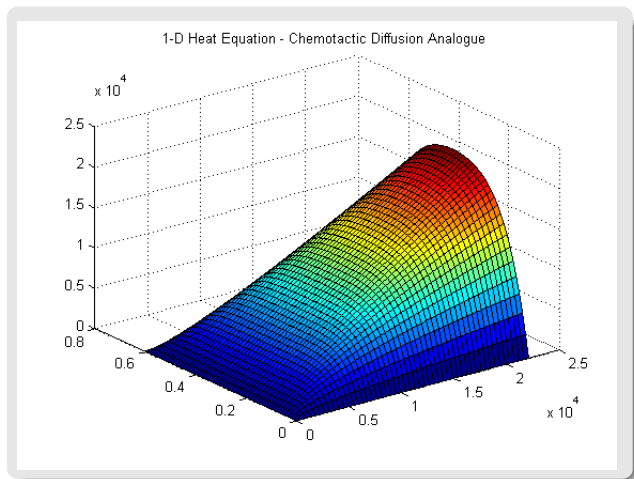
# Persamaan Differensial Biasa



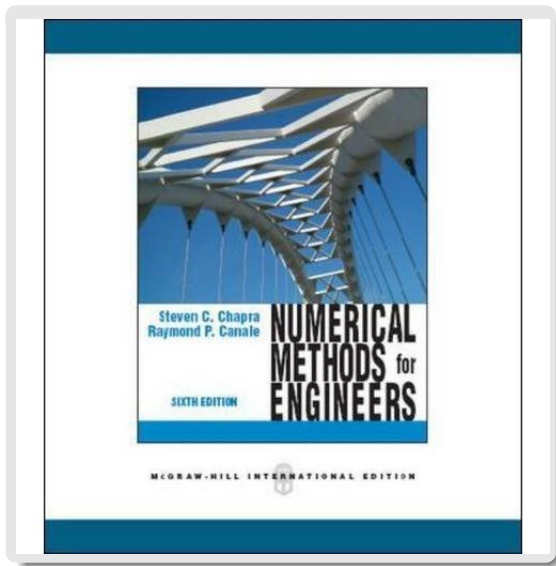
Di berikan  $\frac{dy}{dt} = f(t, y)$  selesaikan  $y$  sebagai fungsi dari  $t$ .

$$y_{i+1} = y_i + f(t_i, y_i) \Delta t$$

# Persamaan Differensial Parsial

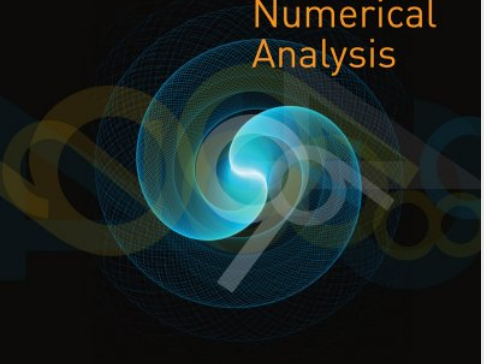


Di berikan  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = f(t, y)$  selesaikan  $u$  sebagai fungsi dari  $x$  dan  $y$ .



Richard L. Burden  
J. Douglas Faires

# Numerical Analysis



Ninth Edition

Pearson International Edition

NINTH EDITION

# CALCULUS



DALE VARBERG EDWIN J. PURCELL STEVEN E. RIGDON