

Metode Numerik

EE221

Bab 0. Aplikasi dan Kegunaan Metode Numerik

Dirangkum dan diterjemahkan dari Thomson Brooks Chapra, Steven and Raymond Canale. 2009.
Numerical Methods for Engineers 6th Edition, **Chapter 1**

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Metode Numerik

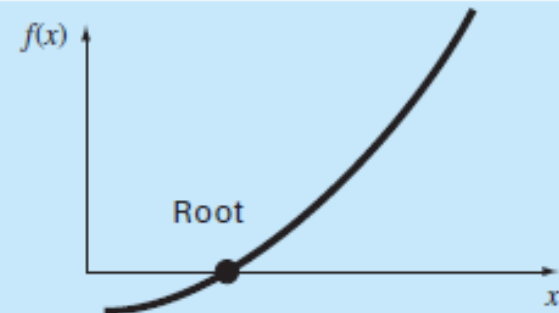
Metode numerik adalah suatu algoritma yang digunakan untuk melakukan perhitungan untuk data numerik

Aplikasi

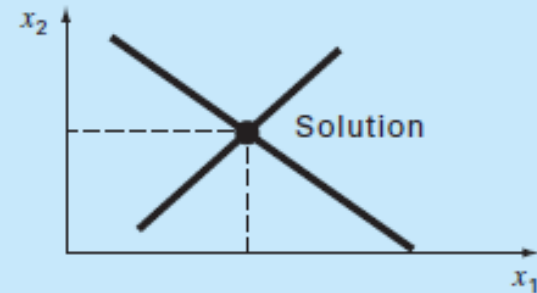
- Menghitung akar suatu persamaan
- Menyelesaikan persamaan differensial biasa
- Menentukan nilai dari suatu persamaan integral
- Menentukan nilai optimum suatu fungsi (optimisasi)
- dll

Aplikasi

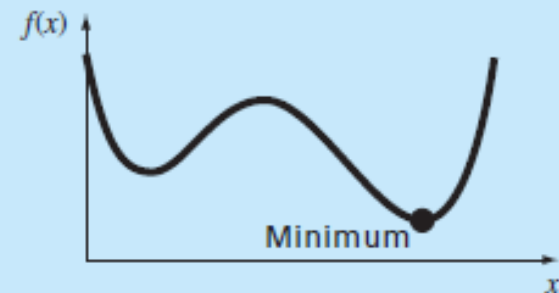
(a) *Part 2: Roots of equations*
Solve $f(x) = 0$ for x .



(b) *Part 3: Linear algebraic equations*
Given the a 's and the c 's, solve
 $a_{11}x_1 + a_{12}x_2 = c_1$
 $a_{21}x_1 + a_{22}x_2 = c_2$
for the x 's.

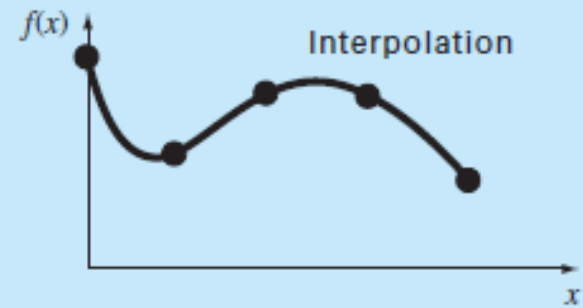


(c) *Part 4: Optimization*
Determine x that gives optimum $f(x)$.



Aplikasi

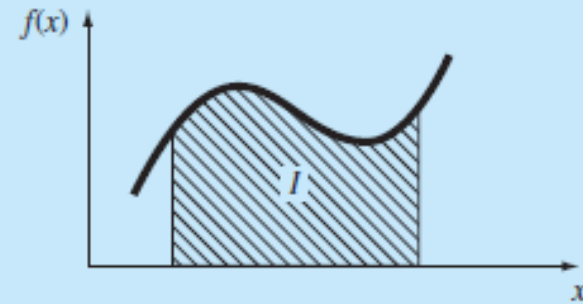
(d) Part 5: Curve fitting



(e) Part 6: Integration

$$I = \int_a^b f(x) dx$$

Find the area under the curve.



Aplikasi

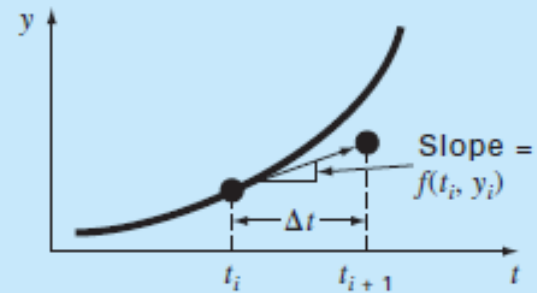
(f) Part 7: Ordinary differential equations

Given

$$\frac{dy}{dt} \simeq \frac{\Delta y}{\Delta t} = f(t, y)$$

solve for y as a function of t .

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

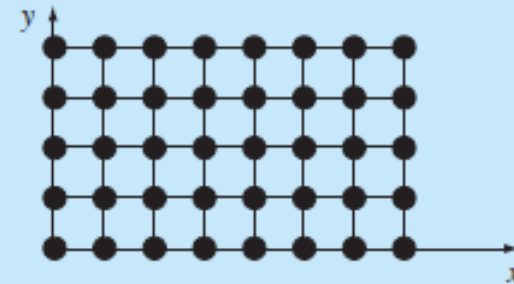


(g) Part 8: Partial differential equations

Given

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = f(x, y)$$

solve for u as a function of x and y



Engineering Problem Solving

Engineering problem-solving processes

