

On the Educational Program of Numerical Nonlinear Equations

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가 . Visual Basic 가
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This is for the visual basic program of numerical methods for solving nonlinear equations, which shows the process, step by step, of various algorithms. It is useful for educating in solving nonlinear equations.

Key words : nonlinear equations, numerical method, visual basic

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Visual Basic
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가 . Visual Basic
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(Objected Oriented Programming)
(Event Driven)
가 가 가
가 (, 1997).

2
가

, 3

. 4
가

2.3 Newton

Newton

x_0

$f(x)$ x_0

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

$$f(x) = 0$$

Honer

, Regular-Falsi , Newton
, , , Muller

2.4 (Secant method)

x_0, x_1

$(x_0, f(x_0)), (x_1, f(x_1))$

x

Newton

Newton

2.1 (Bisection method)

$$f(a)f(b) < 0 \quad [a, b]$$

$f(x) = 0$

가

$$c = \frac{a+b}{2} \text{ 가}$$

$$f(a)f(c) < 0 \quad [a, c]$$

[c, b] 가

[a, b]

$|f(c)|$ 가

가

가

가

2.5

$$g(x) = x$$

x_0

가

$$x_n = g(x_{n-1}), n \geq 1$$

$\{x_n\}$

$$f(x) = 0 \quad \alpha$$

α 가

$$g(x) = x - f(x)$$

$g(x)$

가

2.2 Regula falsi

Regula falsi

[a, b]

$(a, f(a)), (b, f(b))$

x

2.6 Homer

$p(x) \quad x - \alpha$

$q(x)$ r (Horner`s algorithm)

$$r = p(\alpha)$$

$$p(x) = (x - \alpha)q(x) + r$$

x

$$p'(x) = q(x) + (x - \alpha)q'(x)$$

$$p'(\alpha) = q(\alpha)$$

$p(x) = 0$ Newton

$$x_{n+1} = x_n - \frac{p(x_n)}{p'(x_n)}$$

$$p(x_n) \quad p'(x_n)$$

2.7 Muller

Muller

가

Newton

Newton

$$f(x) = 0$$

$$x_0, x_1 \quad y = f(x)$$

$$(x_0, f(x_0)), (x_1, f(x_1))$$

x

x_2

Muller

$$x_0, x_1, x_2$$

$$y = f(x)$$

$$(x_0, f(x_0)), (x_1, f(x_1)), (x_2, f(x_2))$$

x

x_3

$$x_3 = x_2 - \frac{2f(x_2)}{b + \text{sign}(b)\sqrt{b^2 - 4af(x_2)}}$$

$$a = \frac{(x_1 - x_2)[f(x_0) - f(x_2)] - (x_0 - x_2)[f(x_1) - f(x_2)]}{(x_0 - x_2)(x_1 - x_2)(x_0 - x_1)}$$

$$b = \frac{(x_0 - x_2)^2[f(x_1) - f(x_2)] - (x_1 - x_2)^2[f(x_0) - f(x_2)]}{(x_0 - x_2)(x_1 - x_2)(x_0 - x_1)}$$

$$b^2 - 4af(x_2)$$

x_3

가

Newton

$$x_0, x_1, x_2$$

가

x_3

$$x_1, x_2, x_3$$

가

1

2

x, y

가 3

(drag and down)

가

가

