Formulario Métodos Numéricos en Ingeniería
Primer Parcial

Bisection

$$x_r = \frac{x_l + x_u}{2}$$

If $f(x_l)f(x_r) < 0$, $x_u = x_r$
$f(x_l)f(x_r) > 0$, $x_l = x_r$

Trapezoidal rule

$$I \simeq (b - a)\frac{f(a) + f(b)}{2}$$

False position

$$x_r = x_u - \frac{f(x_u)(x_l - x_u)}{f(x_l) - f(x_u)}$$

If $f(x_l)f(x_r) < 0$, $x_u = x_r$
$f(x_l)f(x_r) > 0$, $x_l = x_r$

Multiple-application trapezoidal rule

$$I \simeq (b - a)\frac{f(x_0) + 2\sum_{i=1}^{n-1} f(x_i) + f(x_n)}{2n}$$

Simpson's 1/3 rule

$$I \simeq (b - a)\frac{f(x_0) + 4f(x_1) + f(x_2)}{6}$$

Newton-Raphson

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$

Multiple-application Simpson's 1/3 rule

$$I \simeq (b - a)\frac{f(x_0) + 4\sum_{i=1,3}^{n-1} f(x_i) + 2\sum_{j=2,4}^{n-2} f(x_j) + f(x_n)}{3n}$$

Secant

$$x_{i+1} = x_i - \frac{f(x_i)(x_{i-1} - x_i)}{f(x_{i-1}) - f(x_i)}$$

Simpson's 3/8 rule

$$I \simeq (b - a)\frac{f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3)}{8}$$