HOJA DE FÓRMULAS PARA EL SEGUNDO PARCIAL

✎Fórmula de Gregory Newton Ascendente

$$P_n(x) = y_0 + \Delta y_0 u + \frac{\Delta^2 y_0}{2!}u(u-1) + \frac{\Delta^3 y_0}{3!}u(u-1)(u-2) + \frac{\Delta^4 y_0}{4!}u(u-1)(u-2)(u-3) + \frac{\Delta^5 y_0}{5!}u(u-1)(u-2)(u-3)(u-4) +$$
$$+ \frac{\Delta^6 y_0}{6!}u(u-1)(u-2)(u-3)(u-4)(u-5) + \frac{\Delta^7 y_0}{7!}u(u-1)(u-2)(u-3)(u-4)(u-5)(u-6) + ...$$

✎Fórmula de Gregory Newton Descendente

$$P_n(x) = y_n + \nabla y_n u + \frac{\nabla^2 y_n}{2!}u(u+1) + \frac{\nabla^3 y_n}{3!}u(u+1)(u+2) + \frac{\nabla^4 y_n}{4!}u(u+1)(u+2)(u+3) + \frac{\nabla^5 y_n}{5!}u(u+1)(u+2)(u+3)(u+4) +$$
$$+ \frac{\nabla^6 y_n}{6!}u(u+1)(u+2)(u+3)(u+4)(u+5) + \frac{\nabla^7 y_n}{7!}u(u+1)(u+2)(u+3)(u+4)(u+5)(u+6) + ...$$

✎ Fórmula de Gauss

$$P_n(x) = f(x_0) + \Delta f(x_0)u + \frac{\Delta^2 f(x_0-h)}{2!}(u-1)u + \frac{\Delta^3 f(x_0-h)}{3!}(u-1)u(u+1) + \frac{\Delta^4 f(x_0-2h)}{4!}(u-2)(u-1)u(u+1) + \frac{\Delta^5 f(x_0-2h)}{5!}$$
$$(u-2)(u-1)u(u+1)(u+2) + \frac{\Delta^6 f(x_0-3h)}{6!}(u-3)(u-2)(u-1)u(u+1)(u+2) + \frac{\Delta^7 f(x_0-3h)}{7!}(u-3)(u-2)(u-1)u(u+1)(u+2)(u+3) +$$

✎ Fórmula de Lagrange

$$\frac{P_n(x)}{(x-x_0)(x-x_1)(x-x_2)...(x-x_n)} = \frac{y_0}{(x-x_0)(x_0-x_1)(x_0-x_2)...(x_0-x_n)} + \frac{y_1}{(x-x_1)(x_1-x_0)(x_1-x_2)...(x_1-x_n)} +$$
$$+ \frac{y_2}{(x-x_2)(x_2-x_0)(x_2-x_1)...(x_2-x_n)} + ... + \frac{y_n}{(x-x_n)(x_n-x_0)(x_n-x_1)...(x_n-x_{n-1})}$$

✎Fórmula de Trapecios

$$A \cong \frac{h}{2}(E+2P+2I)$$

✎Fórmula de Simpson

$$A \cong \frac{h}{3}(E+2P+4I)$$

✎Fórmula 3/8 de Simpson

$$A \cong \frac{3h}{8}(y_0+3y_1+3y_2+y_3)$$

✐ Interpolación Parabólica Progresiva

$$P_n(x) = f(x_0) + f(x_1,x_0)(x-x_0) + f(x_2,x_1,x_0)(x-x_0)(x-x_1) + f(x_3,x_2,x_1,x_0)(x-x_0)(x-x_1)(x-x_2) + \ldots$$

$$f(x_1,x_0) = \frac{y_1 - y_0}{x_1 - x_0}$$

$$f(x_0,x_1,x_2) = \frac{f(x_2,x_1) - f(x_1,x_0)}{x_2 - x_0} \qquad f(x_2,x_1) = \frac{y_2 - y_1}{x_2 - x_1}$$

$$f(x_0,x_1,x_2,x_3) = \frac{f(x_3,x_2,x_1) - f(x_2,x_1,x_0)}{x_3 - x_0} \qquad f(x_1,x_2,x_3) = \frac{f(x_3,x_2) - f(x_2,x_1)}{x_3 - x_1}$$

$$f(x_0,x_1,x_2,x_3,x_4) = \frac{f(x_4,x_3,x_2,x_1) - f(x_3,x_2,x_1,x_0)}{x_4 - x_0} \qquad f(x_1,x_2,x_3) = \frac{f(x_3,x_2) - f(x_2,x_1)}{x_3 - x_1}$$

✐Método de Euler

$$x_{i+1} = x_i + h$$
$$y_{i+1} = y_i + y_i' h$$

✐Método Modificado de Euler

$$P(y_{i+1}) = y_i + y_i' h$$
$$C(y_{i+1}) = y_i + \left[\frac{y_i' + P(y_{i+1}')}{2}\right] h$$
$$C^1(y_{i+1}) = y_i + \left[\frac{y_i' + C(y_{i+1}')}{2}\right] h$$

✐Método de Runge Kutta de 2do Orden

$$y_{i+1} = y_i + \left[\tfrac{1}{2}(k_1 + k_2)\right]$$
$$k_1 = hf(x_i, y_i)$$
$$k_2 = hf(x_i + h, y_i + k_1)$$

✐Método de Runge Kutta de 4to Orden

$$y_{i+1} = y_i + \left[\tfrac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)\right]$$
$$k_1 = hf(x_i, y_i)$$
$$k_2 = hf(x_i + \tfrac{h}{2}, y_i + \tfrac{k_1}{2})$$
$$k_3 = hf(x_i + \tfrac{h}{2}, y_i + \tfrac{k_2}{2})$$
$$k_1 = hf(x_i + h, y_i + k_3)$$

✐Método de Milne

$$P(y_{i+1}) = y_{i-3} + \tfrac{4}{3} h\left(2y_i' - y_{i-1}' + 2y_{i-2}'\right)$$
$$C(y_{i+1}) = y_{i-1} + \tfrac{h}{3}(y_{i-1}' + 4y_i' + P\left(y_{i+1}'\right)$$

✐Método Modificado de Hamming

$$P(y_{i+1}) = y_{i-3} + \tfrac{4}{3} h\left(2y_i' - y_{i-1}' + 2y_{i-2}'\right)$$
$$M(y_{i+1}) = P(y_{i+1}) - \tfrac{112}{121}[P(y_i) - C(y_i)]$$
$$C(y_{i+1}) = \tfrac{1}{8}[9y_i - y_{i-2} + 3h[M(y_{i+1}') + 2y_i' - y_{i-1}']]$$
$$F(y_{i+1}) = C(y_{i+1}) - \tfrac{9}{121}[P(y_{i+1}) - C(y_{i+1})]$$