

$$1 R = \int_1^2 \sin(x) + x \, dx$$

$$h = x_1 - x_0$$

$$A = \int_1^2 \sin x + x \, dx \approx \frac{h}{2} [F(x_0) + F(x_1)]$$

$$\|E_T\| \leq \frac{h^2}{12} \max |F''(x)| \quad 1,500436$$

$$A = 2,375384$$

$$h = 1 \quad \frac{1}{2} \cdot 3 = \frac{3}{2}$$

$$\|E_T\| \leq \frac{1}{12} = 0,017452$$

$$F(x) = \sin x + x$$

$$F'(x) = \cos x + 1$$

$$F''(x) = -\sin x$$

$$\|E_T\| \leq \frac{1}{2} = 0,5$$

$$\max |F''(x)| = 1$$

$$A = A_{\text{approx}} - E_T$$

$$x=1$$

$$E_T = 0,420735$$

$$0,841470$$

2,4564

88888888

2-R:

$$\int_1^2 \sin(x) + x \, dx$$

$N=8$

$$h = \frac{2-1}{8} = \frac{1}{8} = 0,125$$

$X_0$	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$	$X_8$
1	1,125	1,250	1,375	1,500	1,625	1,750	1,875	2
$F(x_i)$	1,8414	2,0272	2,1989	2,3558	2,4974	2,6235	2,7339	2,8280

Regra das trapézios composta

$$\int_1^2 \sin(x) + x \, dx \approx \frac{h}{2} [f_0 + 2f_1 + \dots + 2f_{N-1} + f_N]$$

$$\left| -\frac{h}{12} (b-a) \max |f''(x)| \right| \quad \frac{1,25}{1000} = \frac{1}{800} = \frac{1}{8} \cdot \frac{1}{100} = 0,00125$$

Erro

$$\int_1^2 \sin x + x \, dx = \frac{1}{16} \quad \frac{39,282}{1000} \quad \frac{h}{2} = 0,0625 = \frac{1}{16}$$

$$\frac{1}{16} \div 12 = \frac{1}{192}$$

$$\int_1^2 \sin x + x \, dx = 2,4551 \quad \max = -\sin(1) = -0,8147$$

$$\text{Erro} = -\frac{h}{12} (b-a) \max |f''(x)|$$

$$\text{Erro} = -\frac{1}{192} = -0,8147$$

$$\text{Erro} = 0,8147 / 192 //$$

$$-\sin(1) = -0,8147$$



$$\frac{1}{2} \div 3 = \frac{1}{6}$$
$$\frac{1}{2} \div 90 = \frac{1}{180}$$

3-R= Regra 1/3 de Simpson

$$\int_1^2 \sin x + x dx$$

$$b-a=2h$$

$$h = \frac{a+b}{2}$$

$$h = \frac{3}{2} //$$

$$X \quad 1 \quad \frac{a+b}{2} \quad 2$$

$$F(x) \quad 1,8415 \quad 2,4975 \quad 2,9093$$

$$\int_a^b F(x) dx = \left( \frac{b-a}{3} \left( F(a) + 4F\left(\frac{a+b}{2}\right) + F(b) \right) \right)$$

$h = \frac{b-a}{2}$   
 $h = \frac{1}{2}$

$$\int_1^2 \sin x + x dx = \frac{14,7408}{6}$$
$$=$$

$$Err = -\frac{1}{90} (h)^5 \max |F^{(4)}(x)| = \frac{14,7408}{6} \approx 2,4568$$

$$f(x) = \sin x + x$$

$$f'(x) = \cos x$$

$$f''(x) = -\sin x$$

$$f'''(x) = -\cos x$$

$$f^{(4)}(x) = \sin x$$

$$-\frac{1}{180} \sin(2) //$$

$$2,4568 - \frac{\sin 2}{180} \approx 2,4517$$