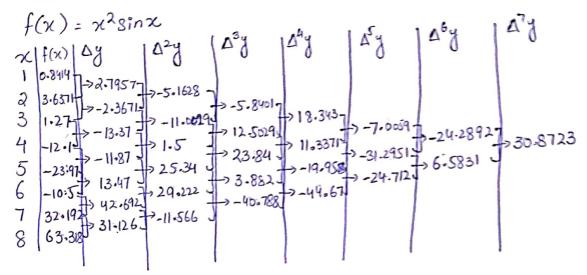
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Course: Numerical Computions

Section: BCS-3B



Newton Forward Interpolation

Newton Forward Strict polacion
$$y_p = y_0 + p_0 + p_0$$

At
$$\chi = 1.5$$
 $\rho = \frac{1.5-1}{1} = 0.5$
 $\chi = 0.8414 + \frac{0.5}{0.8414} + \frac{0.5}{0.8414} + \frac{0.25}{0.25} + \frac{0.375}{0.2892} + \frac{0.375}{0.375} + \frac{0.375}{0.375} + \frac{0.9375}{0.9375} + \frac{0.9375$

= 2.6068 accurate to 1 s.f original value : (1.5) (Sin(1.5)) = 2.244

Newton Backward Interpolation

$$y_{p} = y_{n} + p\nabla y_{n} + \frac{p(p+1)\nabla^{2}y_{n} + p(p+1)(p+2)\nabla^{3}y_{n}}{3!} + \frac{p(p+1)(p+2)(p+3)\nabla^{3}y_{n} + p(p+1)(p+2)(p+3)(p+3)(p+4)(p+3)(p+3)(p+4)(p+5)}{5!}$$

$$+ \frac{p(p+1)(p+2)(p+3)(p+4)(p+5)}{6!}\nabla^{3}y_{n} + \frac{p(p+1)(p+2)(p+3)(p+4)(p+5)(p+6)}{7!}\nabla^{3}y_{n}$$

At 20=7.5 p=7.5-8 = -0.5 y-05 = 63.318+ (-0.5)(31.26) + (-0.25)(-11.566) + (-0.375)(-40.788) + (-0.9875)(-44.67) + (-24.712)(-3.2805) + (-14.765625)(6-5831) ++ (30.8723)(-81.2104375) = 63.318+(15.563)+ 1.4457+2.5492+1.7449+0.6757+(0.135)+(-0.4974) accurate to 13.f original value (7.58 sin(7.5) = 52.7624 At x = 4.5 P. forward interpolation p = 4.5 - 1 = 3.5 $\sqrt{3.5} = 0.8414 + (2.7957)(3.5) + (-5.1628)(8.75) + (-5.8401)(13.125) + (18.343)(6.5625) + (18.345)(6.5625) + (18.345)(6.5625) + (18.345)(6.5625) + (18.345)(6.5625) + (18.345)(6.5625$ +(-7.0059)(-3.28125) + (-24.2892)(4.9218) + (30.8723)(-12.3046)= 0,8414 + 9.7849 + (-22.5872) + (12.7752) + 5,0156 + 0.195 + (-0.1660) + (-0.0753) accurate to I decimal place -19.7703 original value (4.5)2 sin(45) = -19.7949 At x=4.5 Newton Backward interpolation $p=\frac{4.5-8}{1}=-3.5$ $\frac{4}{3.5} = 63.318 + (-3.5)(31.126) + \frac{(-11.566)(8.75)}{2!} + \frac{(-40.788)(-13.125)}{3!} + \frac{(-44.67)(6.5625)}{2!}$ 4(-24.712)(3.28125) + (6.5831)(4.9218) + (30.8723)(12.5046)5! = 63.318 + (-108.941) + (-50.60125) + 89.22375+(-12.214)-0.6757 +(0.045) 4 0.0753 accurate to 1 decimal place -19.7699

= -19.7699 accurate to 1 decimal place original value = -19.7699

