Lec. 20-b-Corollaries

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 $\lim_{\lambda \to 0} \frac{(x+h)^n - \chi^n}{\lambda} = n\chi^{n-1}$ $(\chi^{n_{1}}) = n \chi^{n}$ lim Sh(x+h)-Sin(x) S'n'(x) = (oS(x))Sih(X+Z) = . - - - product Than-CoS(X)Sin(Z) + Cos(Z)Sin(Z) $\cos(x) = -Sh(x)$ $\left(e^{\chi} \right) = e^{\chi}$ Λ Λ () Λ ()

$$\lim_{R \to 0} \frac{\sin(x+z) - \sin(x)}{h} = \left(\cos(x) \left(\frac{\sin(z)}{h} \right) + \frac{\sin(x) \left(\cos(z) - 1 \right)}{2} \right)$$

$$\left(\frac{\cos(z)}{h} + \frac{1}{2} \right) = \left(\frac{\cos(z)}{h} + \frac{1}{2} \right)$$

the definition of sin and cas are . uniform cauchy limit of a sequence of polynomials

Since we showed

$$Sin'(x) = Los(x)$$
 and $Cos(x) = -Sin(x)$
 $\implies Cos^{2}(x) + Sin^{2}(x) = 1$

Why! let $f(x) = Cog^2(x) + Sin^2(x)$ $f'(x) = 2ilos(x) \cdot (os'(x) + 2sih(x)sh'(x))$ $= 2 \cdot (\delta S(\lambda) \cdot (-S(\lambda)) + 2 \cdot (\delta S(\lambda) - S(\lambda)) = 0$

BY M.V.T. $f \equiv Constant$ But Cos(G) = I and Sih(G) = G $i \cdot (OS^2(X) + Sin(X) = I$