i)'ft

Sea fcx) --Txy a -- 8

Para hollar es~~t~~e valor , cakulamos el polinomio de Taylor de orden n de la ~~fu~~nction f en et punto a ~~-~~8 Su expression es la sigvien~~t~~e :

FF --pn.se/H~~=~~fC8)t~~f~~'(8) f~~t~~ -8) tf~~"z!~~) (7-~~8~~5 + . . .tf~~"n~~~~!~~)ft -s) "

8

8 n

=~~f-~~ (8) -~~f~~'(8) ~~+~~~~fz~~ ~~+~~. ..~~t~~f~~"n~~ C~~-~~ IT ~~t~~Rns ft)

Necesi~~ta~~mos un error menorque10-~~2~~ ,que dependera'de n. ~~Es~~ dear, el valor absolute del Resto de Lagrange debe Ser Menor que10-~~2~~ :

Irn

.am/--ffCxl-pn~~.~~aCxH-/fInIIf ~~!!~~ ft ~~-~~8T?"cx-aY~~t~~n~~/a~~s~~o~~-2lxsoc~~a~~)/Rn.sCH/--/fY 1--14~~11,44~~1<10-~~2~~ Cases)

No ~~te~~nemos c , por lo que aco~~t~~amos f'"''Cc) superiormente~~e~~ .Para ello , hallamos la expression de la derivada Cn~~t~~s) -e'sima .

-2 -S 10

f~~-~~ Cx) - Tx f'"(x) --~~J~~-3- x'% --~~EYE~~ ~~f~~'Cx) :~~3-~~ x'% =~~33¥~~ f'"Cx)--gy ,py~~F~~

-80

f- "Cx) -~~I~~.~~-3~~×-93=5~~×29×7~~ f's'G) --z~~:{%~~

Deducimos que su expression es la sigu~~i~~ente :

n

~~"~~s ~~If~~k -3i)

f"(x) --zn~~t~~yn #knew

Aco~~t~~amos If""G) / sabiendoque7~~- s~~o < 8 .Cuarto ma's precise sea es~~t~~a aco~~t~~acidn , menor Sera'et nqueCaladenia. t~~.IT~~/1~~-~~3i)/ 2 -S -8.11.14 - - -Gt3)

H'"icy .it?.I?ri?lczn+~~.+n-~~-zn+..anE~~s~~tecocientetiend~~e~~

a infinite cuando n -~~s~~oo .

Sin embargo , podemos observer que :

H~~I~~USill i

If ""'(c)/ 'zn+..anflo para , al memos ,he [ 1,16]

Nos qaeda :

fwm)(c) <~~To~~

IRn.sn/--/cn+n!/p/cn+n!/E~~1~~0-2V-1~~E~~nE16Calculamos

un nque cumpla es~~t~~a desigualdad :

A

poin~~t~~y!E 10-2 ⇐ (h~~t~~t)! y24310

n ~~=~~3

Observacidu : Si hubie's emos acot~~a~~do mais f'""(c) , habr~~ia~~mos podido Coger n2 , que ~~ta~~mbieh nos da un

error menor que10-~~2~~ .

Lugo , para cakular TF

bas~~t~~a cakularp.s.t~~t~~) ..an un error menor que10-~~2~~ , 3

2 10

Pgs (7~~)~~ =2 -~~TT~~ -288.2-gqz.co=1,91295 EFF

Con la calculadora : Ft =1,91293. . .

ii) sent~~'z~~ )

Sea ~~f-~~ (x) --Senk) y a--O

Al igual que an~~te~~s , caloulamos el polinomio de ~~Ta~~ylor de order n de la funcidn f en el punto a --O Sent~~z~~) --pnf.o~~t~~h~~t~~trn.~~L~~I/~~=~~fCGtf' Co) -~~I~~t . .

~~.tt?.~~z9~~t~~R~~n.~~o~~l~~Z)~~N~~e~~c~~esi~~t~~amos un error menor que10-~~2~~ ,que depeindera'de n. ~~E~~s dear ,el valor absolute del Resto de Lagrange debe Ser Menorque10" "fatal ( c)

( Rn .am/-~~-~~f~~f~~Cxl-~~p~~n.alx)/-/c~~n+p~~ ! ( x -a)" "/ - so"( acccx)

. .lt~~/=~~Ifn~~Ij?!zn!~~/ - so"Cocos ~~'s)~~ Irn

No ~~te~~nemos c , por lo que aco~~t~~amos f'"''Cc) superiormente~~e~~ .Para ello , hallamos la expression de la derivada Cn~~t~~s) -e'Sima :

f~~-~~ Cx) --Sen (x) f~~-~~ ""Lx) --Sen (x)

f~~-~~ '(x) :cos (x) f'"Cx) -cos (x)

(6)

~~f-~~ "Lx) . -Sen Lx) f Cx) . -Sen Lx) i (7) f'"G) = -cos Cx) f G) = -cos Cx)

Deducimos que :

f Cx) --Sen (x) C~~-~~ s)"

flat" =cos G) C~~-~~ IT

Susti~~tv~~imos C en amebas expressions yaco~~t~~amos : I~~fa~~n'cat --Isen call ' Sen (~~E)~~ ~~=~~D( o~~e~~lo.~~F~~I) Ifk" "(c) I --Kos I < cos (o) --I

Por ~~t~~anto ,

lrn.ofzklfn.int?!zn!~~/~~sin+n!.zn+.eso-2Cakulamos

un nque verifique la desigualdad an~~te~~rior : (n~~t~~h! .znti£ 10"⇐ In~~t~~l)! .2" 'f (3+1) ! 23~~+~~1--384 > 100

1

n ~~=~~3

Luego , para cakular sen~~t~~) con un error menor que10", Catalano P,,o(~~E)~~ "

Pao (~~Z~~~~)~~ --I-~~I~~ -~~¥~~.~~12~~3=0,4791~~8~~ =Sen (~~E~~)

Con la calculadora :Sen f~~t)~~ :0,4794 . . .