Aproximacion de pade

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0.1. Problema

Aproximacion del seno

```
program pade
implicit none

real(kind=8), external :: seno_p
real(kind=8) :: seno_z, x, y, error
integer :: i

!salida de datos

open (11, file = ’seno.dat’)

  do i = -31415926, 31415926, 1000
    x= i * 0.0000001
     seno_z=Sin(x)
      print*, x, seno_z
  end do

print*, ’’

  do i = -31415926, 31415926, 1000
    x= i * 0.0000001
     y = seno_p(x)
      print*, x, y
  end do

close (11)

end program pade

!==================

function seno_p(x)
```

```
!==================

implicit none

real (kind=8), intent(in):: x
real (kind=8) :: seno_p, seno_w, seno_v

seno_w = x - (x**3) * (2363.0/18183.0) + (x**5) * (12671.0/4363920.0)

seno_v=1 + (x**2) * (445.0/12122.0) + (x**4) * (601.0/872784.0) + (x**6)*(121.0/16

seno_p = seno_w/seno_v

end function seno_p
```

Error relativo del seno

```
    program pade
implicit none

real(kind=8), external :: seno_p
real(kind=8) :: seno_z, x, y, error_p
integer :: i

open (11, file = 'errorseno_p')

   do i = 0, 31415926, 1000
     x = i * 0.0000001
      y = seno_p(x)
       seno_z=Sin(x)
        error_p = seno_z - (y / seno_z)
         print*, x, error_p
   end do

   close (11)
```

```
end program pade

!===================

function seno_p(x)

!===================

implicit none

real (kind=8), intent(in):: x
real (kind=8) :: seno_p, seno_w, seno_v

seno_w = x - (x**3) * (2363.0/18183.0) + (x**5) * (12671.0/4363920.0)

seno_v=1 + (x**2) * (445.0/12122.0) + (x**4) * (601.0/872784.0) + (x**6)*(121.0/16

seno_p = seno_w/seno_v

end function seno_p
```

0.2. Problema

Funcion exponencial ”F02”

```
    program pade
implicit none

!declaracion de variables
real(kind=8), external :: exp_f02
real(kind=8) :: x, y, error, exp_a
integer :: i

!salida de datos

open (11, file = ’exp_f02.dat’)
```

```
  do i = -3141592, 3141592, 1000
    x= i * 0.000001
     y = exp_f02(x)
      exp_a= exp(x)
       error = exp_a -(y/exp_a)
        print*, x, error !resultados
  end do

print*, ’’

close (11)

end program pade

!===================

function exp_f02(x)

!===================

implicit none

real (kind=8), intent(in):: x
real (kind=8) :: exp_f02, w, v

w = 1.00

v = 1.00 - x + (x**2.00) * (1.00/2.00)

exp_f02 = w/v



end function exp_f02
```

Funcion exponencial ”F11”

```
    program pade
implicit none

!declaracion de variables
real(kind=8), external :: exp_f11
real(kind=8) :: x, y, error, exp_a
integer :: i

!salida de datos

open (11, file = 'exp_f11.dat')

  do i = -3141592, 3141592, 1000
    x= i * 0.000001
     y = exp_f11(x)
       exp_a= exp(x)
        error = exp_a -(y/exp_a)
         print*, x, error !resultados
  end do

print*, ''

close (11)

end program pade

!===================

function exp_f11(x)

!===================

implicit none

real (kind=8), intent(in):: x
real (kind=8) :: exp_f11, w, v

w = 1.00 + x * (1.00/2.00)
```

```
v = 1.00 - x * (1.00/2.00)



exp_f11 = w/v

end function exp_f11
```

Funcion exponencial ”F20”

```
program pade
implicit none

!declaracion de variables
real(kind=8), external :: exp_f20
real(kind=8) :: x, y, error, exp_a
integer :: i

!salida de datos

open (11, file = ’exp_f20.dat’)

  do i = -3141592, 3141592, 1000
    x= i * 0.000001
     y = exp_f20(x)
       exp_a= exp(x)
        error = exp_a -(y/exp_a)
         print*, x, error !resultados
  end do

print*, ’’

close (11)

end program pade
```

```
!===================

function exp_f20(x)

!===================

implicit none

real (kind=8), intent(in):: x
real (kind=8) :: exp_f20, w, v

v = 1.00

w = 1.00 + x + (x**2.00) * (1.00/2.00)

exp_f20 = w/v

end function exp_f20
```