Evaluación 2

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0.1. Problema 1 (Area)

Se nos pide modificar un código para calcular un el área de un triangulo de lados a, b, c. A continuación, el código ya modificado para calcular el área:

Código

```
PROGRAM Triangle
IMPLICIT NONE
REAL :: a, b, c, Area
PRINT *, 'Welcome, please enter the lengths of the 3 sides.'

READ*, a, b, c
PRINT *,'Triangles area:', Area(a,b,c)
END PROGRAM Triangle
FUNCTION Area(x,y,z)
IMPLICIT NONE
     REAL :: Area             ! function type
REAL, INTENT( IN ) :: x, y, z
REAL :: theta, height
   theta = ACOS((x**2+y**2-z**2)/(2.0*x*y))
   height = x*SIN(theta); Area = 0.5*y*height
END FUNCTION Area
```

Usando la misma idea se pidió calcular el volumen, utilice el siguiente código:

0.2. Problema 1 (volumen)

Código

```
PROGRAM Paralelepipedo
IMPLICIT NONE
```

```
 REAL :: a, b, c, v
  PRINT *, 'Ingresar los valores a, b, c para calcular el volumen del paralelepipe
  READ *, a, b, c
  PRINT *, 'Volumen del paralelepipedo', v(a,b,c)

END PROGRAM Paralelepipedo

FUNCTION v(x,y,z)

IMPLICIT NONE

 REAL :: v !Tipo Function
 REAL, INTENT( IN ) :: x, y, z

 v= x*y*z

END FUNCTION v
```

0.3. Problema 2

Ahora se nos pide obtener la gráfica del siguiente código que resuleve el movimiento de un objeto sujeto a un resorte obedeciendo la ley de Hooke.

Código

```
PROGRAM ONE_D_MOTION
IMPLICIT NONE

! Program for the motion of a particle subject to an external force f(x) = -x.
! We have divided the total time 2*pi into 10000 intervals with an equal time
! step. The position and velocity of the particle are written out at every 500
! steps.

 INTEGER, PARAMETER :: N=10001,IN=500
 INTEGER :: I
 REAL :: PI,DT
```

```
 REAL, DIMENSION (N):: T,V,X

! Assign constants, initial position, and initial velocity

  PI   = 4.0*ATAN(1.0)
  DT   = 2.0*PI/FLOAT(N-1)
  X(1) = 0.0
  T(1) = 0.0
  V(1) = 1.0

! Recursion for position and velocity at later time

   DO I = 1, N-1
     T(I+1) = DT*I
     X(I+1) = X(I)+V(I)*DT
     V(I+1) = V(I)-X(I)*DT
   END DO

! Write the position and velocity every 500 steps
  OPEN (6,FILE='problemados.dat')
     WRITE (6,"(3F16.8)") (T(I),X(I),V(I),I=1,N,IN)
    CLOSE (6)
END PROGRAM ONE_D_MOTION
```

Gráfica

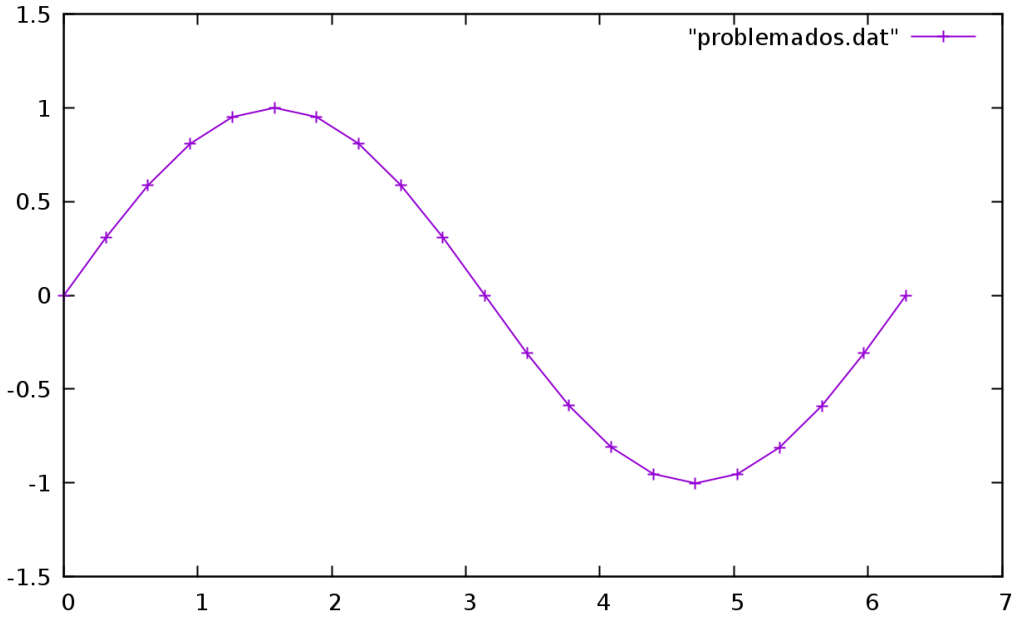

Figura 1:

0.4. Problema 2 (k=0.5, 1.0 y 2.0)

Ahora se nos pide que modifiquemos el codigo para contemplar resortes de constante k y comparar tres casos (k=0.5, 1.0 y 2.0)

```
 PROGRAM ONE_D_MOTION
IMPLICIT NONE

! Program for the motion of a particle subject to an external force f(x) = -x.
! We have divided the total time 2*pi into 10000 intervals with an equal time
! step. The position and velocity of the particle are written out at every 500
! steps.

 INTEGER, PARAMETER :: N=10001,IN=500
 INTEGER :: I
 REAL :: PI,DT,k
 REAL, DIMENSION (N):: T,V,X
```

```
  WRITE(*,*) 'Dé el valor de k'
  READ*, k

! Assign constants, initial position, and initial velocity

  PI   = 4.0*ATAN(1.0)
  DT   = 2.0*PI/FLOAT(N-1)
  X(1) = 0.0
  T(1) = 0.0
  V(1) = 1.0

! Recursion for position and velocity at later time

   DO I = 1, N-1
     T(I+1) = DT*I
     X(I+1) = X(I)+V(I)*DT
     V(I+1) = V(I)-k*X(I)*DT
   END DO

! Write the position and velocity every 500 steps
    OPEN (6,FILE='problemados.dat')
     WRITE (6,"(3F16.8)") (T(I),X(I),V(I),I=1,N,IN)
    CLOSE (6)
END PROGRAM ONE_D_MOTION
```

Gráfica k=0.5

05.png

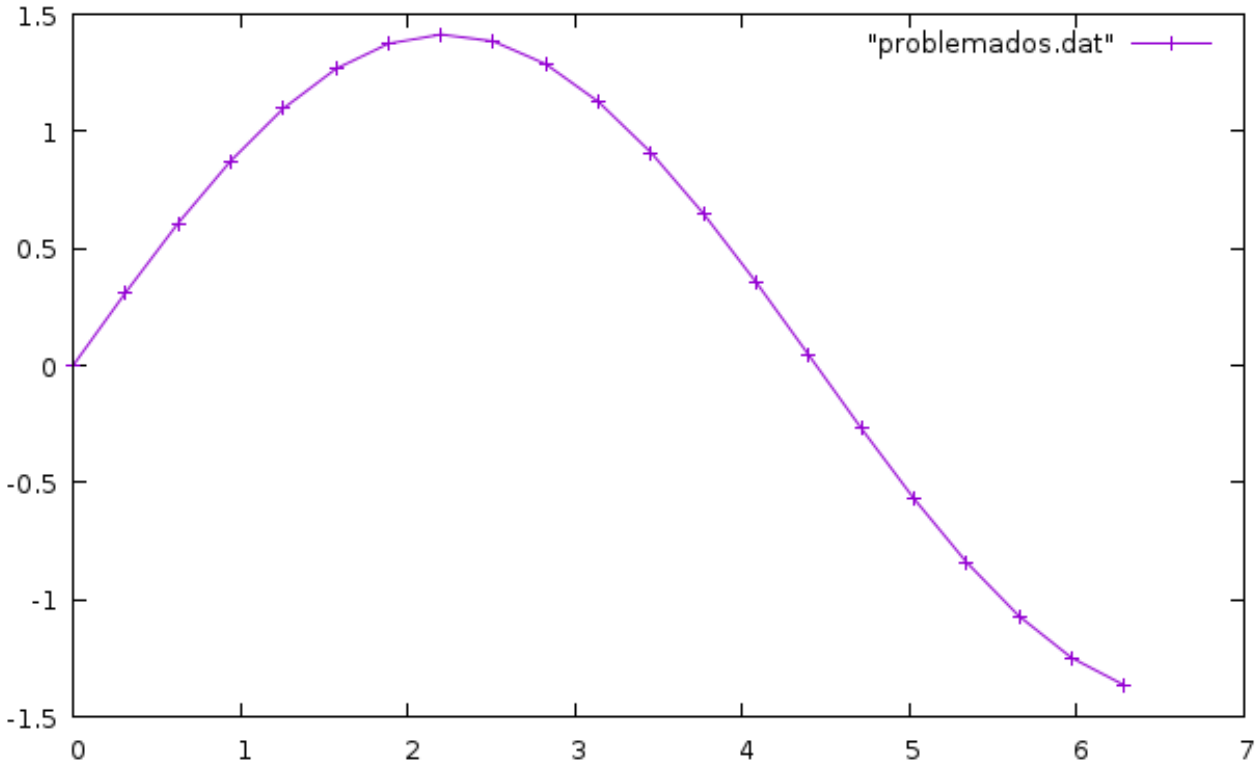

Figura 2:

Gráfica k= 1.0

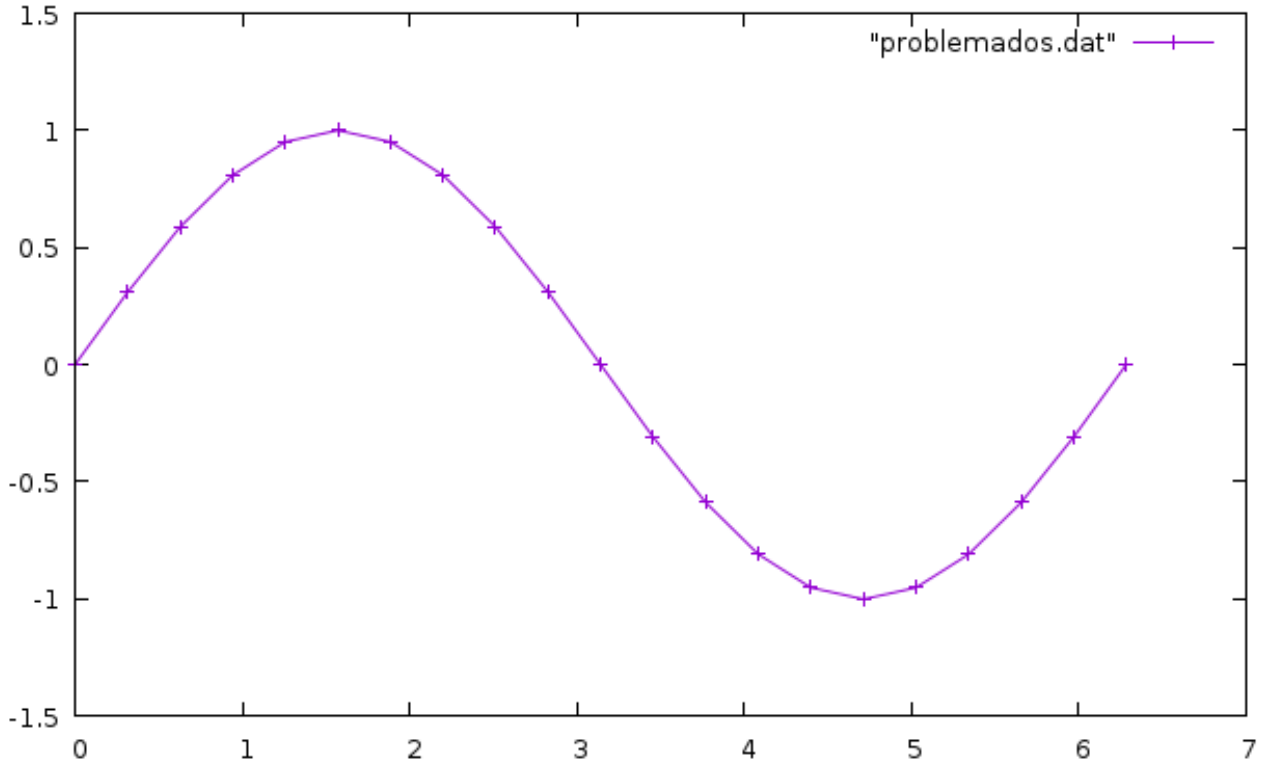

Figura 3:

Gráfica k= 2.0

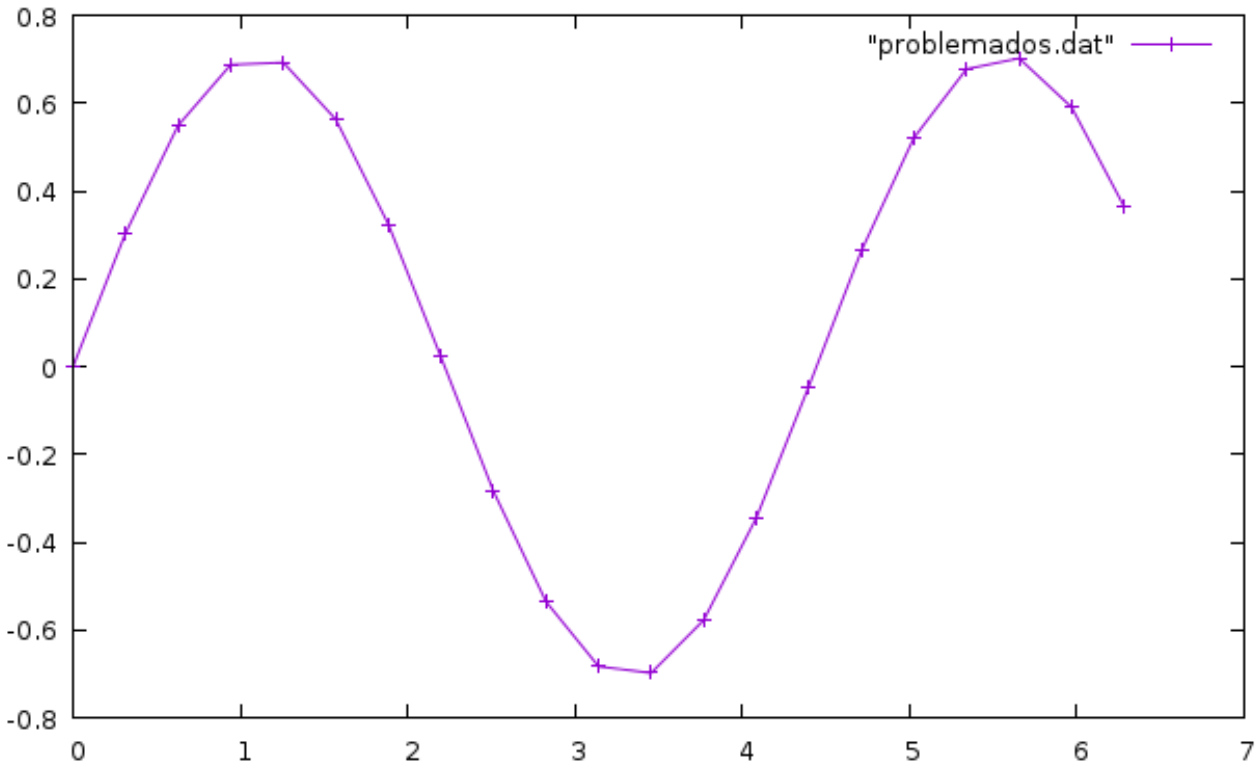

Figura 4: