Ejercicio5_4MTN

May 27, 2020

[4]:
```
from google.colab import drive
drive.mount('/content/gdrive')
import sys
```

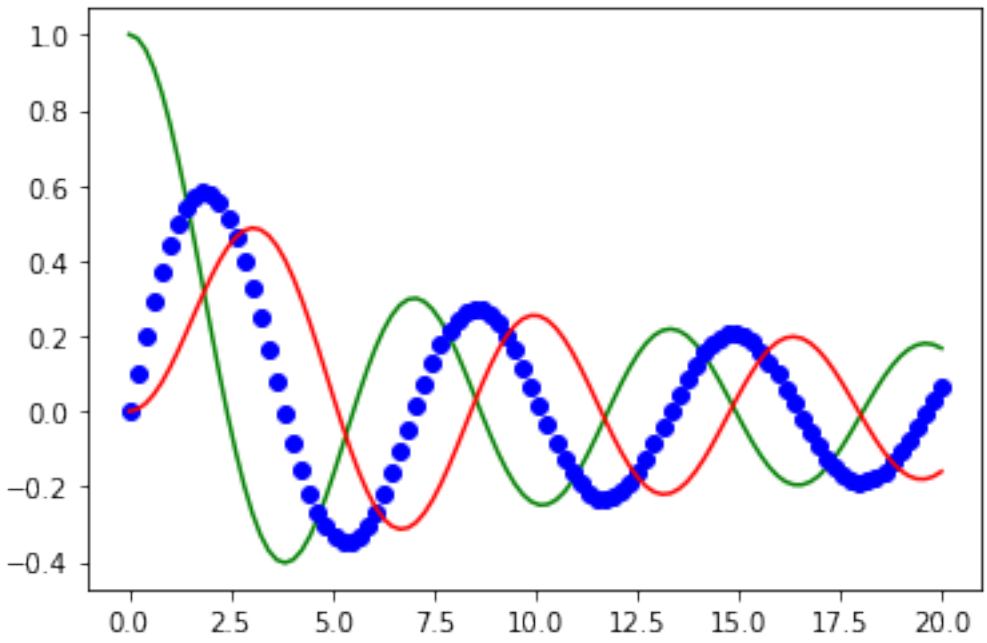
```
Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client_id
=947318989803-6bn6qk8qdgf4n4g3pfee6491hc0brc4i.apps.googleusercontent.com&redire
ct_uri=urn%3aietf%3awg%3aoauth%3a2.0%3aoob&response_type=code&scope=email%20http
s%3a%2f%2fwww.googleapis.com%2fauth%2fdocs.test%20https%3a%2f%2fwww.googleapis.c
om%2fauth%2fdrive%20https%3a%2f%2fwww.googleapis.com%2fauth%2fdrive.photos.reado
nly%20https%3a%2f%2fwww.googleapis.com%2fauth%2fpeopleapi.readonly

Enter your authorization code:
··········
Mounted at /content/gdrive
```

EJERCICIO 5.4 PARTE A:

[0]:
```
from numpy import loadtxt, sum, array, linspace, exp, arange, pi, cos, sin,␣
 ↪sqrt, empty, log
from math import factorial, tanh, cosh
from pylab import plot, show, xlabel, ylabel, imshow, hot, xlim, ylim, gray
```

[6]:
```
def J(m, x):
  def f(m, x, theta):
    return cos(m*theta - x* sin(theta))

  N = 1000
  a = 0
  b = pi
  h = (b - a) / N
#metod de simpson
  oddSum = 0
  for k in range(1, N, 2):
    oddSum += f(m, x, a + k*h)

  evenSum = 0
  for k in range(1, N, 2):
    evenSum += f(m, x, a + k*h)
```

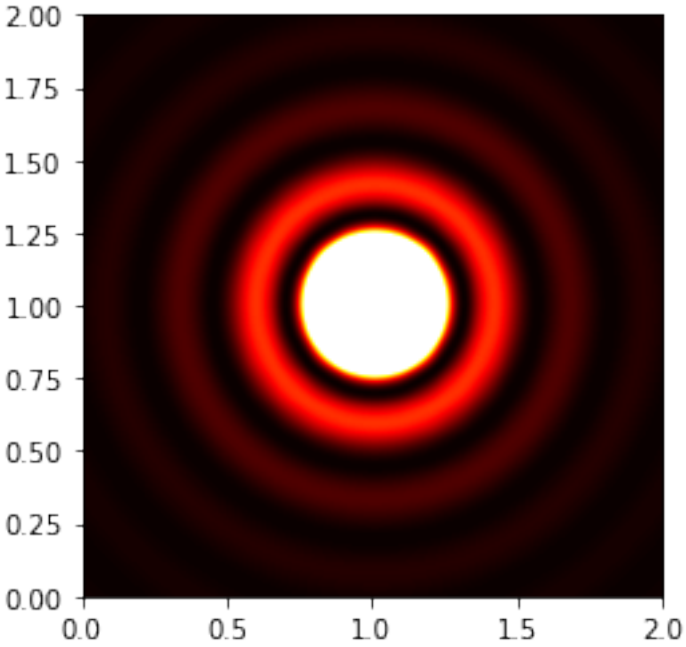
```
  return 1 / pi * 1 / 3 * h * (f(m, x, a) + f(m, x, b) + 4 * oddSum + 2 *␣
 ↪evenSum) #retornamos a la integral

#plot(J0, J1, J2)
xpoints = linspace(0, 20, 100) #hace una matris ordenada con un inicio y una␣
 ↪terminacion y una total de particiones
J0 = [] #son matrices vacias
J1 = []
J2 = []
for x in xpoints:
  J0.append(J(0, x)) #
  J1.append(J(1, x))
  J2.append(J(2, x))

plot(xpoints, J0, "g")#para los puntos
plot(xpoints, J1, "ob")
plot(xpoints, J2, "r")
show()
```



PARTE B:

[7]:
```
def r(x, y):
  return sqrt(x**2 + y**2)

def I(r):
  if (r == 0):
```

```
    return 1/4

  Lambda = 0.5 # en micrómetros
  kr = 2 * pi / Lambda * r
  return (J(1,kr)/ kr)**2

side = 2 # longitud en micrómetros
points = 200 # número de puntos de cuadrícula en cada dirección
spacing = side/points

# Calcule la posición del centro.
xCenter = side/2
yCenter = side/2

# Hacer una matriz vacía para almacenar valores
intensities = empty([points, points], float)

# Calcule los valores en la matriz
for i in range(points):
  y = spacing * i
  for j in range(points):
    x = spacing * j
    dist = r(x - xCenter, y - yCenter)
    intensities[i, j] = I(dist)

imshow(intensities, origin="lower", extent=[0,side,0,side], vmax=0.01)#diseño␣
 ↪para los anillos de la grafica
hot()
show()
```



[0]: