mcpp_taller6_john_caro

September 28, 2016

1 Taller 6

Métodos Computacionales para Políticas Públicas - URosario

Entrega: viernes 30-sep-2016 11:59 PM

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1.1 Instrucciones:

- Guarde una copia de este *Jupyter Notebook* en su computador, idealmente en una carpeta destinada al material del curso.
- Modifique el nombre del archivo del *notebook*, agregando al final un guión inferior y su nombre y apellido, separados estos últimos por otro guión inferior. Por ejemplo, mi *notebook* se llamaría: mcpp_taller6_santiago_matallana
- Marque el *notebook* con su nombre y e-mail en el bloque verde arriba. Reemplace el texto "[Su nombre acá]" con su nombre y apellido. Similar para su e-mail.
- Desarrolle la totalidad del taller sobre este *notebook*, insertando las celdas que sea necesario debajo de cada pregunta. Haga buen uso de las celdas para código y de las celdas tipo *markdown* según el caso.
- Recuerde salvar periódicamente sus avances.
- Cuando termine el taller:

    1. Descárguelo en PDF. Si tiene algún problema con la conversión, descárguelo en HTML.
    2. Suba todos los archivos a su repositorio en GitHub, en una carpeta destinada exclusivamente para este taller, antes de la fecha y hora límites.

(Todos los ejercicios tienen el mismo valor.)

1.1.1 Resuelva las partes 1 y 3 de este documento.

```
In [228]: import numpy as np
          import scipy.linalg as la
          import matplotlib.pyplot as plt
          import math as math
```

2 1.1

```
In [202]: x = np.array(2)
          print(x)
```

```
2
```

3 1.2

```
In [203]: print(x*x) #comando para elevar al cuadrado
```

```
4
```

```
In [204]: print(x*x*x) #comando para elevar al cubo
```

```
8
```

4 1.3 y 1.4

```
In [205]: theta = np.array(90)
```

```
In [206]: print(np.sin(theta)) #comando para calcular el seno de theta
```

```
0.893996663601
```

```
In [207]: print(np.cos(theta)) #comando para calcular el coseno de theta
```

```
-0.448073616129
```

Los ángulos que se ingresan en np.cos() y en np.sin() se ingresan en radianes, es decir, estos comandos usan radianes

5 1.5 y 1.6

```
In [208]: meshPoints = np.linspace(-1,1,500)
```

```
In [209]: meshPoints
```

```
Out[209]: array([-1.        , -0.99599198, -0.99198397, -0.98797595, -0.98396794,
                 -0.97995992, -0.9759519 , -0.97194389, -0.96793587, -0.96392786,
                 -0.95991984, -0.95591182, -0.95190381, -0.94789579, -0.94388778,
                 -0.93987976, -0.93587174, -0.93186373, -0.92785571, -0.9238477 ,
                 -0.91983968, -0.91583166, -0.91182365, -0.90781563, -0.90380762,
```

```
-0.8997996 , -0.89579158, -0.89178357, -0.88777555, -0.88376754,
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```

```
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0.96392786,  0.96793587,  0.97194389,  0.9759519 ,  0.97995992,
0.98396794,  0.98797595,  0.99198397,  0.99599198,  1.        ])
```
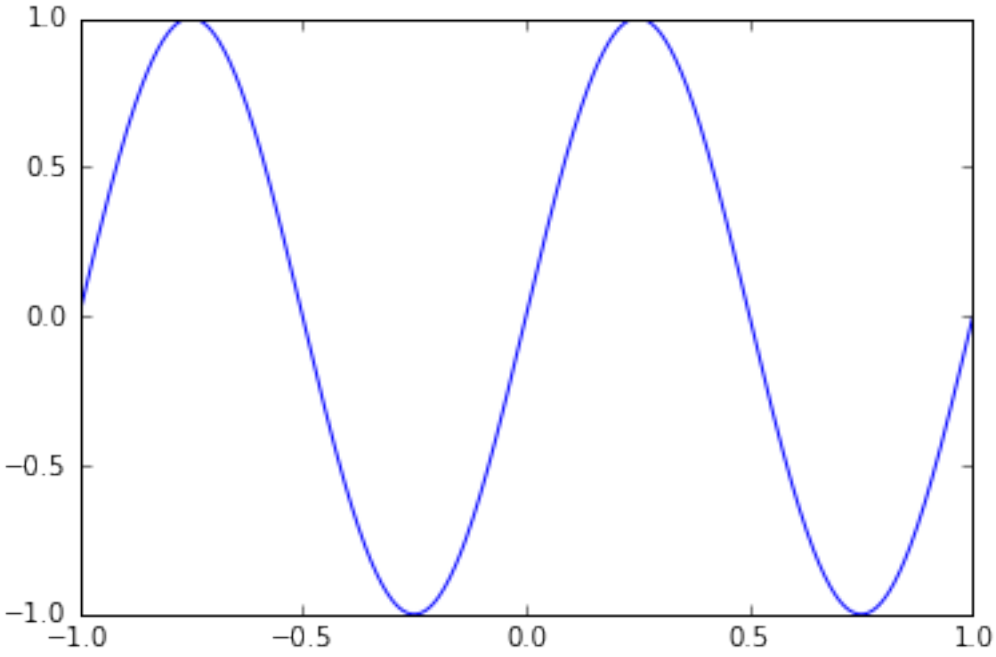

```
In [210]: meshPoints[52] #elemento 53a de meshPoimts

Out[210]: -0.79158316633266534
```

6 1.7

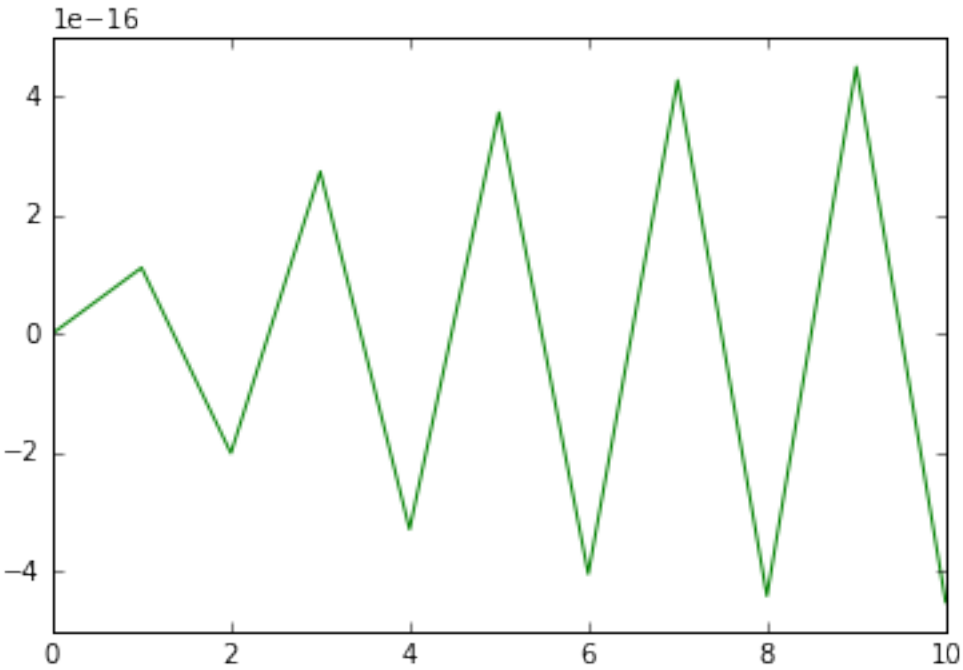
```
In [211]: %matplotlib inline

          plt.plot(meshPoints,np.sin(2*math.pi*meshPoints))
          plt.savefig("sinusoid on the interval [−1, 1].jpg")
```



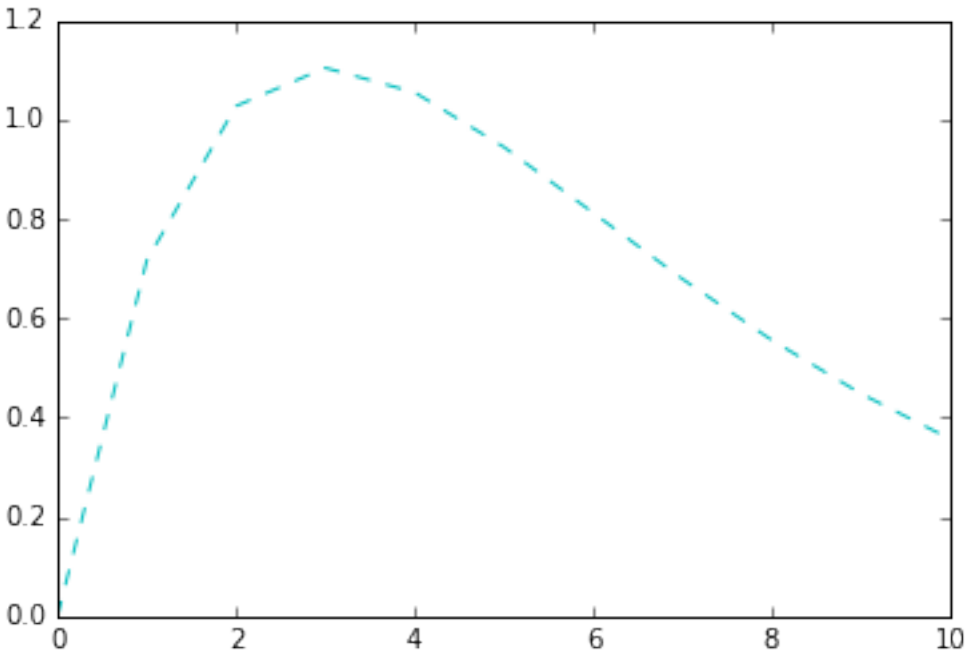
7 3.1

```
In [212]: def f(x):
              f = (math.e**(-(x/10)))*(np.sin(math.pi*x))
              return f

          def g(x):
              g = (x*(math.e**(-(x/3))))
              return g

In [213]: x = np.array([0,1,2,3,4,5,6,7,8,9,10])
          f(x)
```

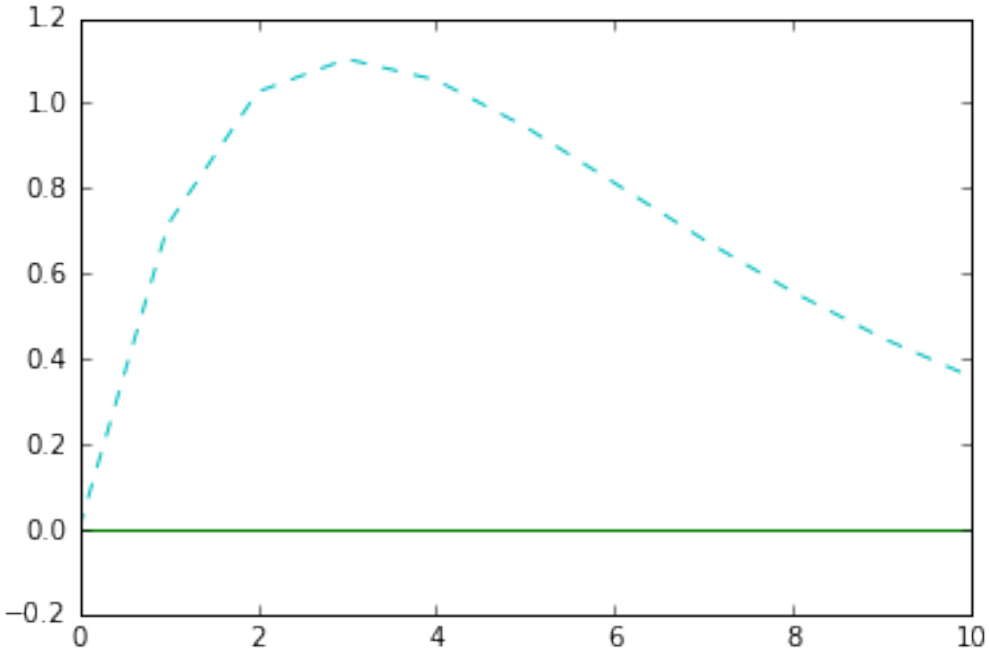
```
Out[213]: array([  0.00000000e+00,   1.10810625e-16,  -2.00531199e-16,
                   2.72172199e-16,  -3.28362120e-16,   3.71392916e-16,
                  -4.03260248e-16,   4.25699122e-16,  -4.40215422e-16,
                   4.48113809e-16,  -4.50522380e-16])

In [214]: g(x)

Out[214]: array([ 0.        ,  0.71653131,  1.02683424,  1.10363832,  1.05438855,
                  0.94437801,  0.8120117 ,  0.67880378,  0.55586761,  0.44808362,
                  0.35673993])

In [215]: plt.plot(x,f(x), "g");
          plt.savefig("función f(x).jpg")
```




```
In [216]: plt.plot(x, g(x), "c--");
          plt.savefig("función g(x).jpg")
```

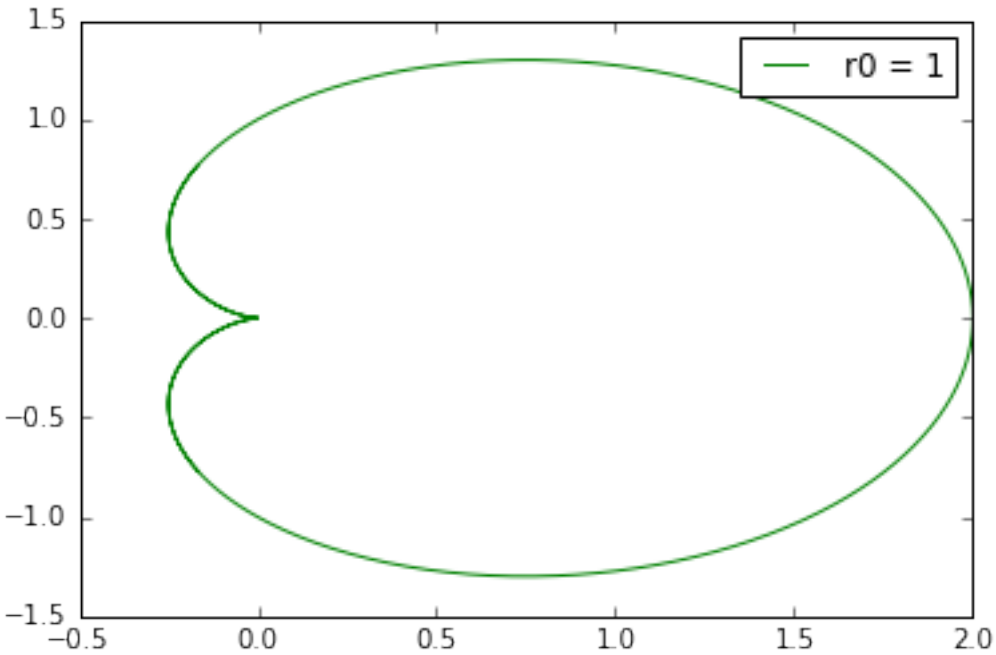



```
In [217]: plt.plot(x,f(x), "g", x, g(x), "c--");
          plt.savefig("funciones f(x) y g(x).jpg")
```



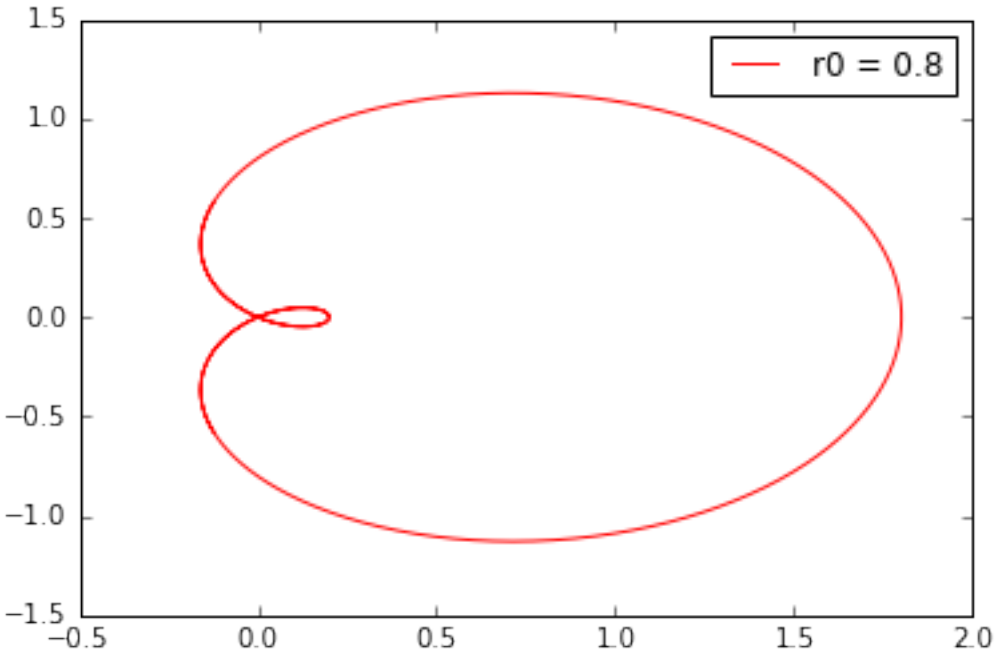
8 3.2

```
In [218]: def limacon(z,theta):
              r = z + np.cos(theta)
              x = r * np.cos(theta)
              y = r * np.sin(theta)
              return r,x,y

In [219]: z = np.array([1])
          theta = np.linspace(-4.5,4.5,2000)

In [220]: limacons = limacon(z,theta)

In [221]: xs1 = limacons[1]
          ys1 = limacons[2]

In [222]: plt.plot(xs1,ys1,"g",label="r0 = 1")
          plt.legend()
          plt.savefig("limaco con ro = 1.jpg")
```

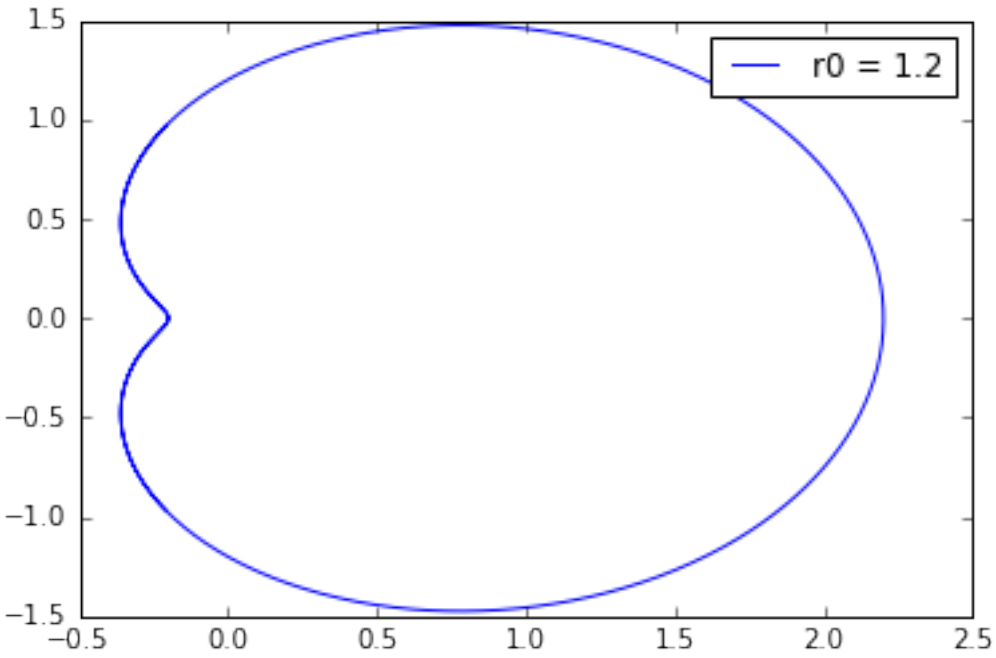



```
In [223]: z = np.array([0.8])
          theta = np.linspace(-4.5,4.5,2000)
          limacons = limacon(z,theta)
          xs2 = limacons[1]
          ys2 = limacons[2]
```

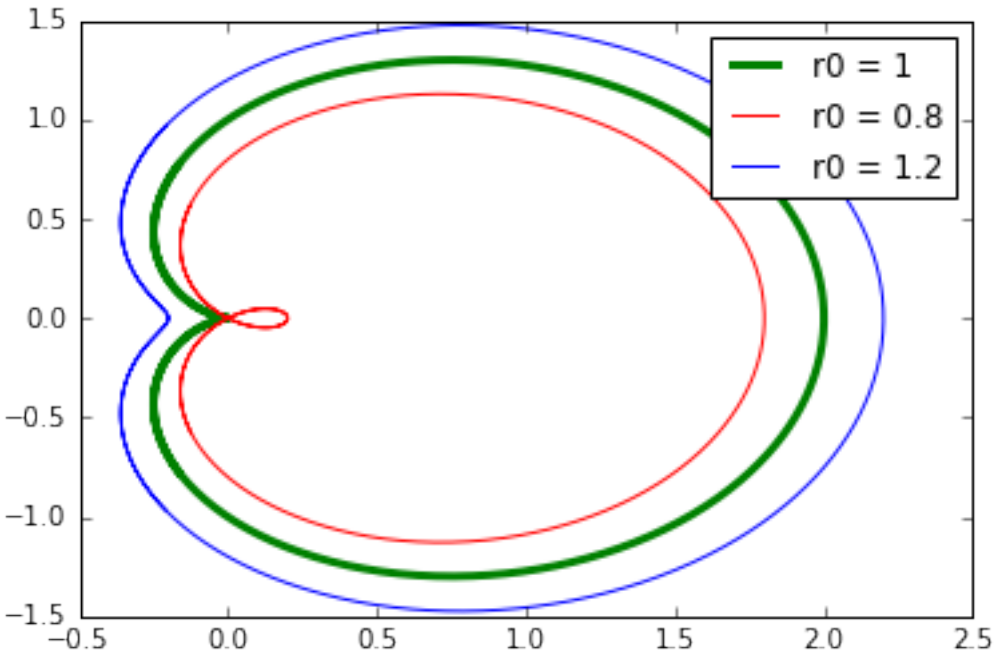
```
In [224]: plt.plot(xs2,ys2,"r",label="r0 = 0.8")
          plt.legend()
          plt.savefig("limaco con ro = 0,8.jpg")
```




```
In [225]: z = np.array([1.2])
          theta = np.linspace(-4.5,4.5,2000)
          limacons = limacon(z,theta)
          xs3 = limacons[1]
          ys3 = limacons[2]

In [226]: plt.plot(xs3,ys3,label="r0 = 1.2")
          plt.legend()
          plt.savefig("limaco con ro = 1,2.jpg")
```



In [229]:
```
plt.plot(xs1,ys1,"g",label="r0 = 1", linewidth=3)
plt.plot(xs2,ys2,"r",label="r0 = 0.8")
plt.plot(xs3,ys3,label="r0 = 1.2")
plt.legend()
plt.savefig("limacos.jpg")
```



In [ ]: