Ejercicio interpolación de Newton-Gregory.
Curso de Física Computacional

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1. Problema

Con la técnica de interpolación de Newton-Gregory, a partir del siguiente conjunto de datos:

x_i	0.4	0.6	0.8	1.0
f_i	0.423	0.684	1.030	1.557

estima el valor de interpolación para:
$x = 0.43, 0.49, 0.5, 0.55, 0.73, 0.75, 0.91, 0.95$

2. Código

```
1  from numpy import *
2
3  def NewtonGregory(x1,deltaX,f,xt):
4      n = len(f)-1
5      deltaF = zeros([n+1,n+1])
6      deltaF[:,0] = f
7      for j in range(1,n+1):
8          for i in range(n-j+1):
9              deltaF[i,j] = deltaF[i+1,j-1]-deltaF[i,j-1]
10     deltaF = deltaF[0:n,1:n+1]
11
12     s = (xt-x1)/deltaX
13
14     yt = []
15     for t in range(len(xt)):
16         sum = f[0]
17         for i in range(n):
18             sum += combinaciones(s[t],i+1)*deltaF[0,i]
19         yt += [sum]
20     return yt
21
22
```

```
23 def combinaciones(s,k):
24     res = 1.0
25     if k!=0:
26         for i in range(1,k+1):
27             res *= (s-i+1)/i
28     return res
29 
30 x = array([0.4,0.6,0.8,1.0],float)
31 f = array([0.423,0.684,1.030,1.557],float)
32 
33 xt = array([0.43, 0.49, 0.5, 0.55, 0.73, 0.75, 0.91, 0.95])
34 
35 ft = NewtonGregory(x[0],x[1]-x[0],f,xt)
36 
37 print 'xt          ft'
38 print '-----------------'
39 for i in range(len(xt)):
40     print '%4.2f  %9.5f' %(xt[i], ft[i])
```