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1  from numpy import zeros, array, linspace
2  from math import factorial
3  from matplotlib.pyplot import plot, axes, xlim, ylim
4
5  def Interpolation(x,u,a) :
6      N = len(x)-1; U = zeros((N+1,N+1))
7      for n in range(N+1) :
8          U[n,0] = u[n]
9      for k in range(1,N+1) :
10         for n in range(N+1-k) :
11             U[n,k] = k*(U[n,k-1] - U[n+1,k-1])/(x[n] - x[n+k])
12         sum = 0.
13         for n in range(N+1) :
14             mult = 1.
15             for k in range(n) :
16                 mult = mult*(a - x[k])
17             sum = sum + U[0,n]/factorial(n)*mult
18         return(sum)
19
20 x = array([5, 3, 2, 6, 1, 7, 8, 9])
21 u = array([2, 4, 4, 3, 1, 3, 4, 2])
22
23 plot(x,u,'go',markersize = 7.)
24
25 x_interp = linspace(1,9,100)
26 u_interp = Interpolation(x,u,x_interp)
27
28 plot(x_interp,u_interp,'-r')
29 xlim((0,10)); ylim((0,6)); axes().set_aspect(1)
30
31 # Листинг программы, реализующей построение
32 # интерполяционного многочлена Ньютона

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