```python
from numpy import zeros, array, linspace, dot, linalg
from matplotlib.pyplot import plot, axes, xlim, ylim

def Integration(x,u) :
    N = len(x) - 1
    int = 0.
    for n in range(1,N+1) :
        int = int + (u[n] + u[n-1])/2*(x[n] - x[n-1])
    return int

def phi(x,k) :
    return x**k

def Approximation(x,u,phi,K,a) :
    N = len(x)-1; A = zeros((K+1,K+1)); B = zeros((K+1,1))
    for m in range(K+1) :
        for k in range(K+1) :
            A[m,k] = Integration(x,phi(x,m)*phi(x,k))
        B[m,0] = Integration(x,phi(x,m)*u)
    C = linalg.solve(A,B)
    sum = 0.
    for k in range(K+1) :
        sum = sum + C[k,0]*phi(a,k)
    return(sum)

x = array([1, 2, 3, 5, 6, 7, 8, 9])
u = array([1, 4, 4, 2, 3, 3, 4, 2])

K = 4

plot(x,u,'go',MarkerSize = 7)

x_approx = linspace(1,9,100)
u_approx = Approximation(x,u,phi,K,x_approx)

plot(x_approx,u_approx,'-r')
xlim([0,10]); ylim([0,6]); axes().set_aspect(1)

# Листинг программы, реализующей построение
# аппроксимирующей функции
```