

1.拉格朗日插值在Python下的实现-调用Lagrange函数

In [13]:

```
from scipy.interpolate import lagrange#直接调用Lagrange (x,y) 函数
```

In [26]:

```
x=[1,2,3,4]#求过(1,5),(2,6),(3,7),(4,9)这四个点的函数  
y=[5,6,7,9]  
f=lagrange(x,y)  
print(f)
```

$$0.1667 x^3 - 1 x^2 + 2.833 x + 3$$

In [27]:

```
print(f(0))#求x=0时的函数值
```

3.0

In [29]:

```
print(f[0],f[1],f[2],f[3])#求函数的系数
```

3.0 2.8333333333333333 -1.0 0.16666666666666667

2.定义Lagrange函数



In [44]:

```
def f(x,y,a):#定义插值函数,其中a为想取函数的值,用来验证
    ans=0.0
    for i in range(len(y)):
        t=y[i]
        for j in range(len(y)):
            if i!=j:
                t*=(a-x[j])/(x[i]-x[j])
        ans +=t
    return ans
x=[1,2,3,4]
y=[5,6,7,9]
print(f(x,y,a))
```

$$0.0007716 x^9 - 0.01389 x^8 + 0.1227 x^7 - 0.625 x^6 + 1.919 x^5 - 3.042 x^4 + 1.18 x^3 + 2.681 x^2 + 3.778 x + 7$$

In [43]:

```
x=[1,2,3,4]
y=[5,6,7,9]
print(f(x,y,a))
```

$$0.0007716 x^9 - 0.01389 x^8 + 0.1227 x^7 - 0.625 x^6 + 1.919 x^5 - 3.042 x^4 + 1.18 x^3 + 2.681 x^2 + 3.778 x + 7$$

In [47]:

```
print(f(x,y,1))#当x=1时可知y=5与所给数值一样
```

5.0

In []: