

# 一维离散卷积实现 moving sum/moving average

```
1 import numpy as np
2
3 x = [1, 2, 3, 4, 5]
```

## 1. Moving sum

```
1 >> np.convolve(x, np.ones(3))    # default mode: full
2
3 1, 1, 1
4     1, 2, 3, 4, 5      = 1
5
6     1, 1, 1
7     1, 2, 3, 4, 5      = 1+2 = 3
8
9         1, 1, 1
10        1, 2, 3, 4, 5    = 1+2+3 = 6
11
12             1, 1, 1
13            1, 2, 3, 4, 5  = 2+3+4 = 9
14
15                 1, 1, 1
16                1, 2, 3, 4, 5 = 3+4+5 = 12
17
18                     1, 1, 1
19                    1, 2, 3, 4, 5 = 4+5 = 9
20
21                         1, 1, 1
22                        1, 2, 3, 4, 5 = 5
23
24
25 >> np.convolve(x, np.ones(3), mode='valid')
26
27 1, 1, 1
28     1, 2, 3, 4, 5      = 1
```

```

29
30     1, 1, 1
31     1, 2, 3, 4, 5      = 1+2 = 3
32
33     1, 1, 1
34     1, 2, 3, 4, 5      = 1+2+3 = 6
35
36     1, 1, 1
37     1, 2, 3, 4, 5      = 2+3+4 = 9
38
39     1, 1, 1
40     1, 2, 3, 4, 5      = 3+4+5 = 12
41
42           1, 1, 1
43     1, 2, 3, 4, 5      = 4+5 = 9
44
45           1, 1, 1
46     1, 2, 3, 4, 5      = 5

```

## 2. Moving average

```

1 >> np.convolve(x, np.ones(3)/3)    # default mode: full
2 >> np.convolve(x, np.ones(3))/3    # default mode: full
3
4 1/3, 1/3, 1/3
5     1, 2, 3, 4, 5      = 1/3
6 1/3, 1/3, 1/3
7     1, 2, 3, 4, 5      = 1/3 + 2/3 = 1
8 1/3, 1/3, 1/3
9     1, 2, 3, 4, 5      = 1/3 + 2/3 + 3/3 = 2
10 1/3, 1/3, 1/3
11    1, 2, 3, 4, 5      = 2/3 + 3/3 + 4/3 = 3
12 1/3, 1/3, 1/3
13    1, 2, 3, 4, 5      = 3/3 + 4/3 + 5/3 = 4
14 1/3, 1/3, 1/3
15    1, 2, 3, 4, 5      = 4/3 + 5/3 = 3
16 1/3, 1/3, 1/3
17    1, 2, 3, 4, 5      = 5/3
18
19 >> np.convolve(x, np.ones(3)/3, mode='valid')
20 1/3, 1/3, 1/3

```

21            1, 2, 3, 4, 5            =  $1/3$

22             $1/3, 1/3, 1/3$

23            1, 2, 3, 4, 5            =  $1/3 + 2/3 = 1$

24             $1/3, 1/3, 1/3$

25            1, 2, 3, 4, 5            =  $1/3 + 2/3 + 3/3 = 2$

26             $1/3, 1/3, 1/3$

27            1, 2, 3, 4, 5            =  $2/3 + 3/3 + 4/3 = 3$

28             $1/3, 1/3, 1/3$

29            1, 2, 3, 4, 5            =  $3/3 + 4/3 + 5/3 = 4$

30             $1/3, 1/3, 1/3$

31            1, 2, 3, 4, 5            =  $4/3 + 5/3 = 3$

32             $1/3, 1/3, 1/3$

33            1, 2, 3, 4, 5            =  $5/3$