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
```

```
1, 1, 1
   1, 2, 3, 4, 5       = 1+2 = 3

   1, 1, 1
   1, 2, 3, 4, 5       = 1+2+3 = 6

      1, 1, 1
   1, 2, 3, 4, 5       = 2+3+4 = 9

         1, 1, 1
   1, 2, 3, 4, 5       = 3+4+5 = 12

            1, 1, 1
   1, 2, 3, 4, 5       = 4+5 = 9

               1, 1, 1
   1, 2, 3, 4, 5       = 5
```

2. Moving average

```
>> np.convolve(x, np.ones(3)/3)   # default mode: full
>> np.convolve(x, np.ones(3))/3   # default mode: full

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

>> np.convolve(x, np.ones(3)/3, mode='valid')
1/3, 1/3, 1/3
```

```
          1,  2,  3,  4,  5       = 1/3
    1/3, 1/3, 1/3
          1,  2,  3,  4,  5       = 1/3 + 2/3 = 1
         1/3, 1/3, 1/3
          1,  2,  3,  4,  5       = 1/3 + 2/3 + 3/3 = 2
            1/3, 1/3, 1/3
          1,  2,  3,  4,  5       = 2/3 + 3/3 + 4/3 = 3
              1/3, 1/3, 1/3
          1,  2,  3,  4,  5       = 3/3 + 4/3 + 5/3 = 4
                  1/3, 1/3, 1/3
          1,  2,  3,  4,  5       = 4/3 + 5/3 = 3
                    1/3, 1/3, 1/3
          1,  2,  3,  4,  5       = 5/3
```