The standard deviation is a measure of the spread of the data. It is the square root of the variance.

1. np.std(A)

This computes the **overall standard deviation** (across all elements in the array).

- Elements in A: [1, 2, 3, 4, 5, 6]
- Mean: (1 + 2 + 3 + 4 + 5 + 6) / 6 = 3.5
- Variance: $((1-3.5)^2 + (2-3.5)^2 + (3-3.5)^2 + (4-3.5)^2 + (5-3.5)^2 + (6-3.5)^2) / 6 = 2.9167$
- Standard deviation: $\sqrt{2.9167} \approx 1.7078$

2. np.std(A, 0)

This computes the **standard deviation along columns** (axis=0).

For each column:

- Column 1: [1, 4] → Mean = 2.5, Variance = $(1-2.5)^2 + (4-2.5)^2 / 2 = 2.25$, Std = $\sqrt{2.25} = 1.5$
- Column 2: [2, 5] → Mean = 3.5, Variance = $(2-3.5)^2 + (5-3.5)^2 / 2 = 2.25$, Std = $\sqrt{2.25} = 1.5$
- Column 3: [3, 6] → Mean = 4.5, Variance = $(3-4.5)^2 + (6-4.5)^2 / 2 = 2.25$, Std = $\sqrt{2.25} = 1.5$

Output:

array([1.5, 1.5, 1.5])

3. np.std(A, 1)

This computes the **standard deviation along rows** (axis=1).

For each row:

- Row 1: [1, 2, 3] → Mean = 2.0, Variance = $(1-2)^2 + (2-2)^2 + (3-2)^2 / 3 = 0.6667$, Std = $\sqrt{0.6667} \approx 0.8165$
- Row 2: [4, 5, 6] → Mean = 5.0, Variance = $(4-5)^2 + (5-5)^2 + (6-5)^2 / 3 = 0.6667$, Std = $\sqrt{0.6667} \approx 0.8165$

Output:

array([0.8165, 0.8165])