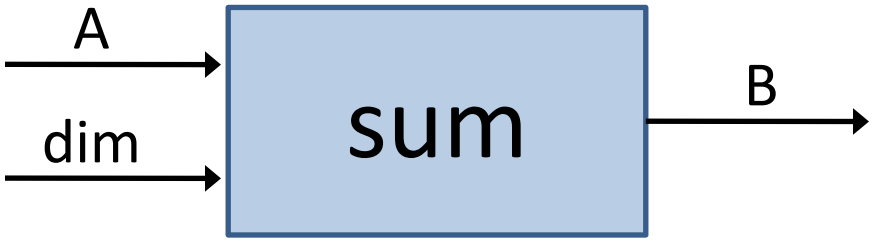
CS 1173: MATLAB sum function

The sum function returns the sum along an array dimension.

```
B = sum(A, dim)
```

resulting sum — array to sum — dimension to sum over



Example 1: Different ways to apply sum to array A

dim 1 ↓ dim 2 →

$$A = \begin{bmatrix} 1 & 2 & 6 \\ 4 & -7 & 0 \end{bmatrix}$$

$$C = \text{sum}(A, 2) = \begin{bmatrix} 9 \\ -3 \end{bmatrix}$$

$$B = \text{sum}(A, 1) = \begin{bmatrix} 5 & -5 & 6 \end{bmatrix}$$

In MATLAB:

```
A = [1, 2, 6; 4, -7, 0];
B = sum(A, 1);
C = sum(A, 2);
```

CS 1173: MATLAB sum function (1 argument)

When you don't include the dimension argument, sum adds along the first non-singleton dimension. For a single row or column, the result is just one number.

```
B = sum(A)
```

resulting sum ← B = sum(A) → array to sum

Example 1: A has both rows and columns

```
A = [1, 2, 6; 4, -7, 0];
B = sum(A);
C = sum(A(:));
```

The first non-singleton dimension is 1

dim 1 ↓ dim 2 →

$$A = \begin{bmatrix} 1 & 2 & 6 \\ 4 & -7 & 0 \end{bmatrix}$$

$$B = \text{sum}(A) = \begin{bmatrix} 5 & -5 & 6 \end{bmatrix}$$

$$C = \text{sum}(A(:)) = 6$$

Example 2: A has just one row

```
A = [1, 2, 6];
B = sum(A);
```

The first non-singleton dimension is 2

$$A = \begin{bmatrix} 1 & 2 & 6 \end{bmatrix}$$

$$B = \text{sum}(A) = 9$$

Example 3: A has just one column

```
A = [1; 4];
B = sum(A);
```

The first non-singleton dimension is 1

$$A = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$$

$$B = \text{sum}(A) = 5$$