**Addition and Scalar Multiplication**

Addition and subtraction are **element-wise**, so you simply add or subtract each corresponding element:

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Subtracting Matrices:

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To add or subtract two matrices, their dimensions must be **the same**.

In scalar multiplication, we simply multiply every element by the scalar value:

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In scalar division, we simply divide every element by the scalar value:

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Experiment below with the Octave/Matlab commands for matrix addition and scalar multiplication. Feel free to try out different commands. Try to write out your answers for each command before running the cell below.

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| % Initialize matrix A and B  A = [1, 2, 4; 5, 3, 2]  B = [1, 3, 4; 1, 1, 1]  % Initialize constant s  s = 2  % See how element-wise addition works  add\_AB = A + B  % See how element-wise subtraction works  sub\_AB = A - B  % See how scalar multiplication works  mult\_As = A \* s  % Divide A by s  div\_As = A / s  % What happens if we have a Matrix + scalar?  add\_As = A + s |

Process:

A =

1 2 4

5 3 2

B =

1 3 4

1 1 1

s = 2

add\_AB =

2 5 8

6 4 3

sub\_AB =

0 -1 0

4 2 1

mult\_As =

2 4 8

10 6 4

div\_As =

0.50000 1.00000 2.00000

2.50000 1.50000 1.00000

add\_As =

3 4 6

7 5 4