

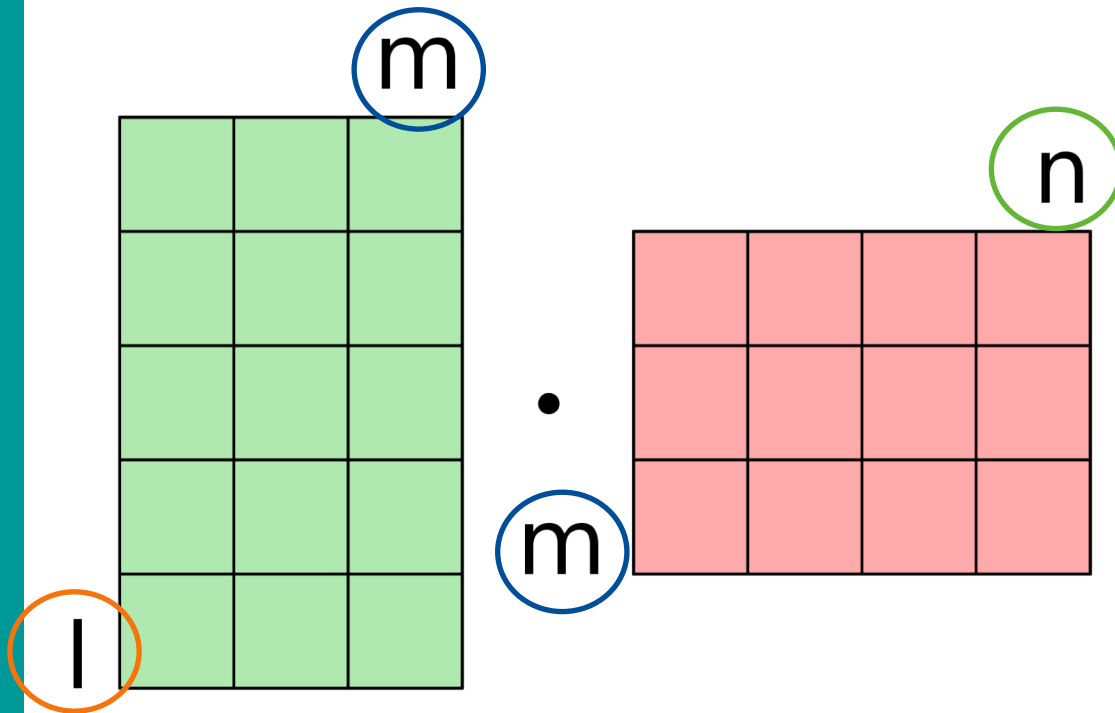
Matrix Algebra

DARTH workgroup

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$$\begin{array}{c}
 \mathbf{A} \quad \cdot \quad \mathbf{B} \\
 \text{I} \times \text{M} \quad \text{M} \times \text{n} \quad \text{—} \\
 \text{5} \times \text{3} \quad \text{3} \times \text{4}
 \end{array}$$

A dashed blue oval highlights the dimensions 3 and 3, indicating that the inner dimensions must match for matrix multiplication.

Matrix Addition

$n \times m$

3×3

$m \times p$

3×3

Diagram illustrating matrix addition. Matrix C is the result of adding matrix A and matrix B. The first column of each matrix is highlighted with a light blue oval.

$$\begin{bmatrix} 1.50 & 0.40 & 0.1 \\ 0 & 1.70 & 0.3 \\ 0 & 0 & 2.0 \end{bmatrix} = \begin{bmatrix} 0.75 & 0.20 & 0.05 \\ 0 & 0.85 & 0.15 \\ 0 & 0 & 1.0 \end{bmatrix} + \begin{bmatrix} 0.75 & 0.20 & 0.05 \\ 0 & 0.85 & 0.15 \\ 0 & 0 & 1.0 \end{bmatrix}$$

In R: `m_A + m_B`

This works similar for subtractions

Matrix Element-wise Multiplication

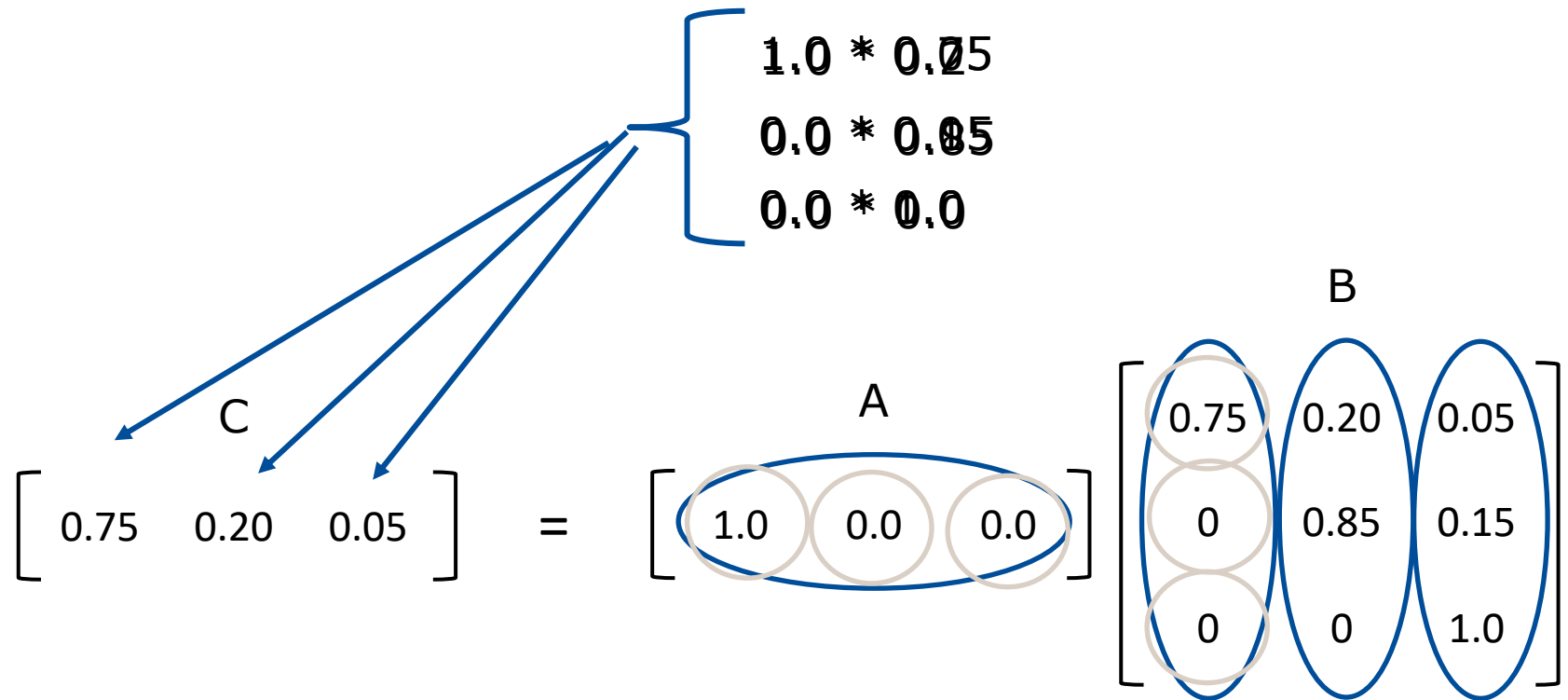
The diagram illustrates the element-wise multiplication of two matrices, A and B, to produce matrix C. Each matrix is represented as a 3x3 grid of elements, with each element enclosed in a blue oval. The matrices are labeled A, B, and C above them.

$$\begin{bmatrix} 0.56 & 0.04 & .0025 \\ 0 & 0.72 & .023 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 0.75 & 0.20 & 0.05 \\ 0 & 0.85 & 0.15 \\ 0 & 0 & 1.0 \end{bmatrix} * \begin{bmatrix} 0.75 & 0.20 & 0.05 \\ 0 & 0.85 & 0.15 \\ 0 & 0 & 1.0 \end{bmatrix}$$

In R: `m_A * m_B`

This works similar for divisions

Matrix Multiplication



In R: `m_A %*% m_B`

DARTH Workgroup

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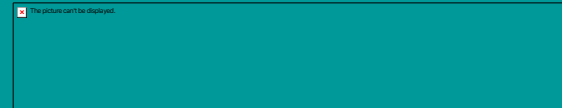
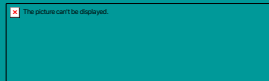
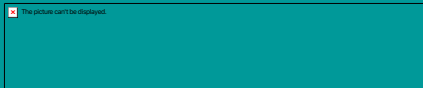
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