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Scalar multiplication of matrices pdf

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A matrix is a rectangular array of numbers, symbols or expressions, arranged in rows and columns. Describe the parts of a matrix and what they represent the keys Takeaways Key points to Matrix $\hat{A}$, (whose plural is matrix) is a rectangular matrix of numbers, symbols or expressions, arranged in rows and columns. A matrix with $[latex] M [/latex]$ $\hat{A}$, lines and $[LATEX] N [/LATEX]$ The columns are called a $[LATEX] M \text{ Times } N [/LATEX]$ $\hat{A}$, Matrix or $[LATEX] M [/LATEX]$ $\hat{A}$, By- $[LATEX] N [/LATEX]$ $\hat{A}$, matrix, where $[LATEX] M [/LATEX]$ $\hat{A}$ ϵ and $[LATEX] N [/LATEX]$ are called the size of the matrix. The matrices can be used to write compatibly and work with more linear equations, ie a system of linear equations. The matrix and multiplication of the matrix reveal their essential characteristics when related to linear transformations, also known as linear maps. Key terms element: a single element in a row vector matrix: a matrix with a single row column carrier: a matrix with a single-column square matrix: a matrix that has the same number of rows and Matrix columns: a matrix Rectangular of numbers, symbols or expressions, arranged in rows and columns The matrix has a long history of application in the resolution of linear equations. They were known as arrays up to $[latex] 1800 [/LATEX]$ $\hat{A} \epsilon \hat{a}, \sim \sim \hat{A}$, the term $\hat{A} \epsilon \hat{a}, \sim \hat{a}$ "matrix $\hat{A} \epsilon \hat{a}, \sim$ (latin for $\hat{A} \epsilon \hat{a}, \sim \hat{a}$ " Domb $\hat{A} \epsilon \hat{a}, \sim$, derived from mater $\hat{A} \epsilon \hat{a}, \sim$ "mother) has been coined by James Joseph Sylvester $\hat{A} \epsilon$ in $[LATEX] 1850 [/LATEX]$, $\hat{A} \epsilon$ Who understood a matrix as an object to give rise to a number of determinants today under minors, ie, decisions of smaller matrices derived from the original by removing columns and lines. $\hat{A}$, an English mathematical named Cullis was the first to use the modern notation of the matrix bracket in $[LATEX] 1913 [/LATEX]$ and has simultaneously demonstrated the first significant use of the notation $[latex] a = a_{\{i,j\}}$ $[/LATEX]$ To represent a matrix in which $[LATEX] A_{\{i,j\}}$ $[/LATEX]$ refers to the element found in the i TH row and the j TH column. The matrices can be used to write and work in a way Compact with more linear equations, indicated as a system of linear equations, simultaneously. The matrices and the multiplication of the matrix reveal the Their essential characteristics when related to linear transformations, also known as linear maps. What is a matrix in mathematics, a matrix (plural matrices) is a rectangular series of numbers, symbols or expressions, arranged in rows and columns. The matrices are commonly written in brackets of the box. The horizontal and vertical lines of the voices in a matrix are called lines and columns, respectively. The size of a matrix is defined by the number of rows and columns it contains. A matrix with M files and columns n is called an M -matrix $[in \text{ latex}] [/ latex]$ -BY- $[LATEX] N [/LATEX]$ Matrix, while M and N are called the size. The size of the following matrix is $[LATEX] 2 \text{ times } 3 [/LATEX]$ $\hat{A}$, up (read $\hat{A} \epsilon \hat{a}, \sim \hat{A}$ "two of three), because there are two lines and three columns. $[Latex] a = \{ displaystyle \begin{matrix} 1 \text{ and } 9 \\ \& -13 \end{matrix} \}$ $[/ latex]$ Dimensions of the matrix: each element of a matrix is Often denoted by a variable with two subscribers. For example, $[LATEX] A_{\{2,1\}}$ $[/LATEX]$ represents the element in the second row and the first column of a matrix A . The individual elements (numbers, symbols or expressions) in a matrix are called elements or insertions. Provided that they are of the same size (they have the same number of rows and the same number of columns), two matrices or subtracted elements can be added. The rule for the multiplication of the matrix, however, is that two matrices can only be multiplied when the number of columns in the first equivalent to the number of In the second. Any matrix can be multiplied element-wise from a climb from its associated field. The matrices that have a single line are called vectors of rows and those who have a single column are called column carriers. A matrix that has the same number of rows and columns is called square matrix. In some contexts, such as computer algebra programs, it is useful to consider a miter without rows or no no Called an empty matrix. Addition and subtraction; Adding scalar multiplication matrix, subtraction and multiplication Scalar "are types of operations that can be applied to change matrices. Exercise added matrices and subtracting, in addition to multiplying matrices to scale the key points of the Takeaway keys when performing The addition, add each element to the first matrix to the corresponding element in the second matrix. When the subtraction is carried out, subtract each element in the second matrix from the corresponding element in the first matrix. Addition and subtraction require the matrices to be the Same dimensions. The resulting matrix is also the same size. The scalar multiplication of a true Euclidean vector of a positive real number multiplies the size of the carrier without changing its direction. Scalar key conditions: a quantity that has magnitude but not direction. There are a series of operations that can be applied to modify the m Sector, such as the matrix, subtraction and multiplication scalar. These form the basic techniques for working with matrices. These techniques can be used to calculate sums, differences and information products such as soft drinks arriving in three different flavors: Apple, orange and strawberry and two different packaging: bottle and can. Two tables that summarize total sales between last month and this month are written to illustrate the amounts. The addition of the matrix, subtraction and multiplication scale can be used to find things like: last month's sales and this month's sales, average sales for each flavor and soda packaging in $[LATEX] 2 [/LATEX]$ -Mont period. Added and subtracting matrix we use matrix to list the data or to represent the systems. As the entries are numbers, we can perform operations on matrices. We add or subtract matrices by adding or subtracting the corresponding rumors. To do this, the items must match. Therefore, added and subtraction of matrices is only possible when the matrices have the same dimensions. $\hat{A}$, the addition of the matrix is commutative and is also associative, so the following is true: $[LATEX] DisplayStyle A + B = B + A [/LATEX]$ $[LATEX] DisplaySyle (A + B) + C = A + (B + C) [/LATEX]$ Add matrices is very simple. Just add each element in the first matrix to the corresponding element in the second matrix. $[latex] displaystyle \begin{matrix} 1 \text{ and } 2 \\ 3 \text{ and } 4 \\ 5 \text{ and } 6 \end{matrix} \} + \begin{matrix} 1 \\ 2 \\ 3 \end{matrix}$ $[/ latex]$ $\{ pmatrix \}$ $10 \text{ and } 20 \text{ and } 30 \text{ and } 40 \text{ and } 50 \text{ and } 60 \text{ end } \{ pmatrix \} = \begin{matrix} 11 \text{ and } 22 \text{ and } 33 \text{ and } 44 \text{ and } 55 \text{ and } 66 \end{matrix}$ $[/LATEX]$ Note that item $\hat{A} \epsilon$ in the first matrix, $[LATEX] 1 [/LATEX]$, adds to the element $[\text{ Latex}] x_{\{11\}}$ $[/ latex]$ $\hat{A} \epsilon$ In the second matrix, $[LATEX] 10 [/LATEX]$, to produce element $[LATEX] x_{\{11\}}$ $[/LATEX]$ $\hat{A}$, in the resulting matrix, $[LATEX] 11 [/LATEX]$. Also note that both added matrices are $[LATEX] 2 \text{ times } 3 [/LATEX]$ and the resulting matrix is also $[LATEX] 2 \text{ times } 3 [/LATEX]$. It is not possible to add two matrices that have different sizes. As you might imagine, subtract works the same way, except I subtract instead of adding. $[Latex] DisplayStyle \begin{matrix} 10 \text{ and } -20 \text{ and } 30 \text{ and } 40 \text{ and } 50 \text{ and } 60 \end{matrix} \text{ END } \{ PMATRIX \} - \begin{matrix} 1 \text{ and } -2 \text{ and } 3 \text{ and } 4 \text{ and } -5 \text{ and } 6 \end{matrix} \text{ END } \{ PMatrix \} = \begin{matrix} 9 \text{ and } -18 \text{ and } 27 \text{ and } 36666 \text{ and } 54 \end{matrix} \text{ END } \{ PMATRIX \} [/LATEX]$ Once again, note that the resulting matrix has the same size as the originals, and that you can't Subtract two matrices that have different sizes. Be careful when subtracting with signed numbers. Multiplication scalar in an intuitive geometric context, multiplication of a real Euclidean carrier by a positive real number multiplies the sizes of the carrier without changing its What does it mean multiply a number of $[latex] 3 [/latex]$ $[/ latex]$? It means that they add the number to itself $[LATEX] 3\text{-stroke } [/ latex]$. Multiply a $[LATEX] 3 [/LATEX]$ matrix means the same thing: The matrix to itself is added $[LATEX] 3\text{-stroke } [/ latex]$, or simply multiply each element from the constant one. $[Latex] DisplayStyle \{ CDOT \begin{matrix} PMATRIX \end{matrix} \{ PMATRIX \} \& 2 \& 3 \{ 4 \text{ and } 5 \text{ and } 6 \text{ end } \{ pmatrix \} = \begin{matrix} 3 \text{ and } 6 \text{ and } 9 \text{ and } 12 \text{ and } 15 \text{ and } 18 \end{matrix} \text{ end } \{ pmatrix \} [/ latex]$ The resulting matrix has the same dimensions Like the original. Scalar multiplication has the following properties: Left and right distribution: $\hat{A} \epsilon [LATEX] (C + D) \text{ TEXTBF } (M) = \text{TEXTBF } (M) (C + D) = \text{TEXTBF } (M) C + \text{TEXTBF } \{ m \} d [/ latex]$ Associativity: $\hat{A}, [latex] (cd) \text{ textbf } \{ m \} = c (d \text{ textbf } \{ m \} = c (\text{ textbf } \{ m \}) \text{ identity } [/ latex]: \hat{A} \epsilon [latex] 1 \text{ textbf } \{ m \} = \text{ textbf } \{ m \} [/ latex]$ null: $\hat{A}, [latex] 0 \text{ textbf } \{ m \} = \text{ textbf } \{ 0 \} [/ latex]$ Reverse additive: $\hat{A} \epsilon [LATEX] (-1) \text{ textbf } \{ m \} = - \text{ textbf } \{ m \} [/ latex]$ Multiplication of the matrix when multiplying the matrices, the elements of the rows in the first matrix are multiplied with the corresponding columns in the second matrix. Practicing the matrices and to locate matrices that can be multiplied points together key key points if $[latex] a$ is a $[latex] n \text{ times } [/ latex]$ a matrix and $[latex] b [/ latex]$ $\hat{a}$, It is a $[Latex] M \text{ Times } P [/LATEX]$ $\hat{A}$, Matrix, the result $[LATEX] AB [/LATEX]$ $\hat{A}$, Multiplication is a $[LATEX] N2 \text{ times } P [/LATEX]$ $\hat{A}$, matrix defined only if the number of columns $[LATEX] M [/LATEX]$ in $[LATEX] A [/LATEX]$ is the same as the number of rows $[\text{ LATEX}] M [/LATEX]$ in $[LATEX] B [/LATEX]$. The product of a square matrix multiplied by a column matrix naturally rises in linear algebra to solve linear equations and representing linear transformations. Matrix key conditions: a rectangular layout of numbers or terms with various uses such as the transformation of coordinates into geometry, solving linear linear equation systems and represent graphs in graph theory. If $[LATEX] A [/LATEX]$ is a $[LATEX] N \text{ Times } M [/LATEX]$ MATRIX and $[LATEX] B [/LATEX]$ is a $[LATEX] M \text{ TIMES } P [/LATEX]$ MATRIX, THE $[LATEX] AB [/LATEX]$ result of their multiplication is a $[LATEX] N \text{ Times } P [/LATEX]$ MATRIX defined only if the number of columns $[LATEX] M [/LATEX]$ in $[LATEX] A [/LATEX]$ It is the number of $[latex] m [/ latex]$ rows in $[latex] B [/ LATTIC]$. $\hat{A}$, check that this is true before multiplying the matrices, since there is $\hat{A} \epsilon \hat{a}, \sim \hat{A}$ "no solution" otherwise. Definition and general process: the multiplication for the multiplication of the matrix is simply multiplying a value through All elements of a matrix, while the multiplication of the matrix is multiplying each element of each line of the first matrix times each element of each column in the second matrix. $\hat{A}$, the multiplication scalar is much simpler than the multiplication of the matrix; however, it exists A model. When multiplying the matrices, the elements of the rows in the first matrix are multiplied with the corresponding columns in the second matrix. Each input of the resulting matrix is calculated one at a time. For two matrices the final position of the product below: $[latex] displaystyle \begin{matrix} \{ a \}_{\{11\}} \{ a \}_{\{12\}} \dots \{ a \}_{\{31\}} \text{ and } \{ a \}_{\{32\}} \end{matrix}$ As a $cdot \& cdot \{ bmatrix \}$ $\begin{matrix} bmatrix \end{matrix} cdot \& \{ b \}_{\{12\}} \text{ and } \{ b \}_{\{13\}} \text{ cl}ot \& \{ b \}_{\{22\}} \& \{ b \}_{\{23\}} \{ bmatrix = \begin{matrix} bmatrix \end{matrix} cl}ot \& x_{\{12\}} \& cdot cl}ot \& cl}ot \& cd}ot \& cd}ot \text{ and } x_{\{33\}} \text{ CDOT and CDOT and CDOT END } \{ BMATRIX \} [/ LATTIC]$ MATRIX Multiplication: This figure schematically illustrates the product of two $AE B$ matrices, which shows how each intersection in the matrix of the product corresponds to a line of A and a column of B . The values in the intersections marked with circles are: $[LATEX] DisplayStyle \{ X \}_{\{12\}} = \{ \{ A \}_{\{11\}}, \{ A \}_{\{12\}} \} CDOT \{ \{ B \}_{\{12\}}, \{ b \}_{\{22\}} \} = \{ \{ A \}_{\{11\}} \{ b \}_{\{12\}} \} + \{ \{ A \}_{\{12\}} \{ b \}_{\{22\}} \} [/LATEX]$ $[Latex] displaystyle \{ x \}_{\{33\}} = \{ \{ a \}_{\{31\}}, \{ a \}_{\{32\}} \} cdot \{ b \}_{\{13\}}, \{ 23 \} \} = \{ \{ a \}_{\{31\}} \{ b \}_{\{31\}} \} + \{ \{ a \}_{\{32\}} \{ b \}_{\{23\}} \{ b \}_{\{23\}} \} [/ latex]$ Multiplication of the matrix: process exam ple 1. $\hat{A}$, find the product $[latex] ab [/ latex]$ $[latex] displaystyle a = \begin{matrix} 1 \} \{ 1 \} \text{ and } \{ 2 \} \{ 1 \} \text{ and } \{ 2 \} \} \{ 3 \} \& \{ 4 \} \text{ end } \{ pmatrix \} quad b = \begin{matrix} pmatrix \end{matrix} \{ 5 \} \& \{ 6 \} \{ 5 \} \text{ and } \{ 6 \} \} \{ 7 \} \& \{ 8 \} \{ 7 \} \text{ and } \{ 8 \} \} \oplus \{ PMATRIX \} [/LATEX]$ First ask: Make the number of columns in $[LATEX] A [/LATEX]$ The number of columns in $[LATEX] A [/LATEX]$ is $[LATEX] A [/LATEX]$ P $\hat{A}$, the number of columns in $[LATEX] B [/LATEX]$ is And the number of rows in $[LATEX] B [/LATEX]$ is also $[LATEX] 2 [/LATEX]$, so there is a product. Start with product production for the first row, first column element. $\hat{A}$, take the first row of Matrix $[LATEX]$ to $[/LATEX]$ $\hat{A} \epsilon$ and multiply from the first matrix column $[LATEX] B [/LATEX]$; $\hat{A}$, the first element of $[LATEX] A [/LATEX]$ times the First column element of $[LATEX] B [/LATEX]$, in addition to the second element of $[LATEX] A [/LATEX]$ TIMES the element of the second column of $[LATEX] B [/LATEX]$. $[Latex] displaystyle ab = \begin{matrix} pmatrix \end{matrix} \{ (1 \text{ cd}ot 5) \} + \{ (2 \text{ cd}ot 7) \} e \{ (1) \& \{ 0 \} \} \} + \{ (0) \& \{ (0) \& \{ 0 \} \} \} \{ PMATRIX \} [/LATEX]$ Continue the model with the first row of $[LATEX] A [/LATEX]$ from the second column of $[LATEX] B [/LATEX]$, and then repeat with The second line of $[LATEX] A [/LATEX]$. AB has rumors defined by the equation: $[LATEX] DisplayStyle AB = \begin{matrix} PMATRIX \end{matrix} \{ (1 \text{ CDOT } 5) \} + \{ (2 \text{ CDOT } 7) \} \& \{ (1 \text{ CDOT } 6) \} + \{ (2 \text{ cd}ot 8) \} \{ 3 \text{ cd}ot 5 \} \} + \{ (4 \text{ cl}ot 7) \} \text{ and } \{ (3 \text{ cl}ot 6) \} + \{ (4 \text{ cl}ot 8) \} \text{ END } \{ PMATRIX \} [/LATEX]$ $[LATEX] DisplayStyle AB = \begin{matrix} PMATRIX \end{matrix} \{ (5 + 14) \} \& \{ ((6 + 16) \} \{ (15 + 28) \} \text{ and } \{ (18 + 32) \} \{ (18 + 32) \} \} \{ (18 + 32) \} \} \{ (18 + 32) \} \} \text{ END } \{ PMATRIX \} [/LATEX]$ $[LATEX] DisplayStyle AB = \begin{matrix} PMATRIX \end{matrix} \{ (19) \} \text{ and } \{ (22) \} \} \{ (43) \} \text{ and } \{ (50) \} \} \text{ END } \{ PMATRIX \} [/LATEX]$ The Identity Matrix The identity matrix $[LATEX] [i] [/LATEX]$ is defined in such a $[latex] [a] [i] = [i] [A] = [A] [/LATEX]$, ie is the matrix version to multiply a number per one. Discuss the owner of the key keys of the Identity Takeaways matrix key points for any square matrix, its identity matrix It is a diagonal stretch of $[LATEX] 1 [/LATEX]$ S passing from the upper left corner to the right, with all other elements that are $[LATEX] 0 [/LAT$ former]. Non-square matrices do not have an identity. ie, for a non-square matrix $[latex] [a] [/ latex]$, there is no matrix so that $[latex] [a] [i] = [i] [a] = [a] [/ latex]$. Trying that the functions of the identity matrix as desired requires the use of the multiplication of the matrix. Matrix key conditions: a rectangular layout of numbers or terms with various uses such as the transformation of coordinates into geometry, solving linear linear equation systems and represent graphs in graph theory. Identity matrix: a diagonal matrix All the diagonal elements are equal to $[LATEX] 1 [/ latex]$, the rest is equal to $[LATEX] 0 [/LATEX]$. The $[LATEX] 1 [/LATEX]$ number has a special property: when you multiply any number with $[LATEX] 1 [/LATEX]$, the result is the same number, ie $[LATEX] 5 \text{ CDOT } 1 = 5 [/LATEX]$. $\hat{A}$, this idea can be expressed with the following properties as algebraic generalization: $[LATEX] 1x = x [/LATEX]$. $\hat{A}$, the matrix that has this property is indicated as the identity matrix. Definition of the identity matrix The identity matrix, designated as $[LATEX] [i] [/LATEX]$, is defined by the property: $[LATEX] DisplayStyle [A] [i] = [i] [a] = [a] [A] = [A] [/LATEX]$. Note that the definition of $[i] [i]$ establishes that the multiplication must switch, ie, must produce the same response, no matter where the order multiplication is performed. This stipulation is important because, for most matrices, multiplication is not around. What a matrix does this property? A first hypothesis could be a full $[latex] 1 [/ latex]$ s matrix, but it doesn't work: $[LATEX] DisplayStyle \begin{matrix} PMATRIX \end{matrix} 1 \& 2 \& 3 \& 4 \text{ END } \{ PMATRIX \} \text{ BEGIN } \{ Pmatrix \} 1 \text{ and } 1 \text{ and } 1 \text{ end } \{ pmatrix \} = \begin{matrix} pmatrix \end{matrix} 3 \text{ and } 3 \text{ and } 7 \text{ end } \{ PMATRIX \} [/LATEX]$ so $[LATEX] \begin{matrix} PMATRIX \end{matrix} 1 \& 1 \text{ and } 1 \text{ END } \{ PMATRIX \} [/LATEX]$ $\hat{A} \epsilon$ is not an identity matrix. The matrix that works is a diagonal stretch of $[latex] 1 [/ in latex]$ s , with all the other $[latex] 0 [/ in latex]$ elements. $[LATEX] DisplayStyle \text{ BEGIN } \{ PMATRIX \} 1 \text{ and } 3 \text{ and } 2 \& 4 \text{ END } \{ PMATRIX \} \text{ BEGIN } \{ PMATRIX \} 1 \text{ and } 0 \text{ and } 1 \text{ End } \{ PMATRIX \} = \begin{matrix} PMATRIX \end{matrix} 1 \text{ and } 3 \text{ and } 2 \& 4 \text{ END } \{ PMATRIX \} [/LATEX]$ In $[LATEX] \begin{matrix} PMATRIX \end{matrix} 1 \& 0 \text{ and } 1 \text{ END } \{ PMATRIX \} [/LATEX]$ $\hat{A} \epsilon$ is the identity matrix for $[latex] 2$ matrices Times $2 [/LATEX]$. For a $[Latex]$ matrix $3 \text{ times } 3 [/LATEX]$, the identity matrix is a matrix $[LATEX] 3 \text{ times } 3 [/LATEX]$ with diagonal $[latex] 1 [/LATEX]$ S and the rest equal to a $[LATEX] DisplayStyle \begin{matrix} PMATRIX \end{matrix} 2 \& \text{ PI } \& -\text{ FRAC } 12 \& -\text{ FRAC } 12 \& 9 \& 8 \& 8.3 \text{ END } \{ PMATRIX \} 1 \& 0 \& 0 \& 1 \& 0 \& 0 \& 0 \& 1 \text{ end } \{ pmatrix \} = \begin{matrix} pmatrix \end{matrix} 2 \& \text{ pi } \& -3.5 \& -2 \& \text{ frac } 12 \& 9 \& 8.3 \text{ END } \{ PMATRIX \} [/LATEX]$ So $[LATEX] \begin{matrix} PMATRIX \end{matrix} 1 \& 0 \& 0 \& 0 \& 1 \& 0 \& 0 \& 1 \text{ END } \{ PMATRIX \} [/LATEX]$ $\hat{A} \epsilon$ is the identity matrix for $[latex] 3 \text{ times } 3$ matrices $[/ latex]$. It is important to confirm these multiplications and also confirm that they work in reverse order (as it requires the definition). There is no identity for a non-square matrix due to the requirement of matrices that are switching. For a non-square matrix $[LATEX] [A] [/LATEX]$ you may be able to find a $[LATEX] [I] [/LATEX]$ matrix, such that $[latex] [A] [i] = [a] [/LATEX]$ However, if the order is inverted, an illegal multiplication will be left. The reason why it's because, for two matrices to multiply, the first matrix must have the same number of columns as the second has the lines. file.

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