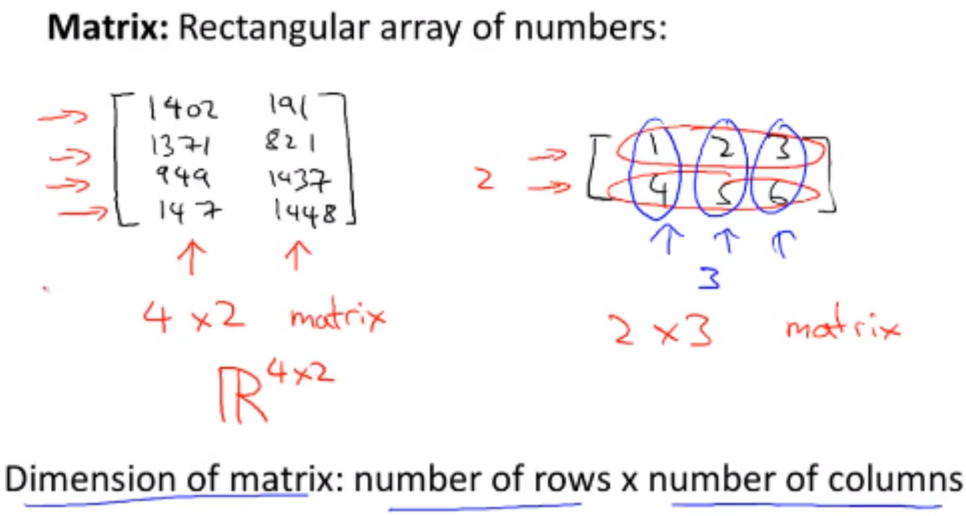
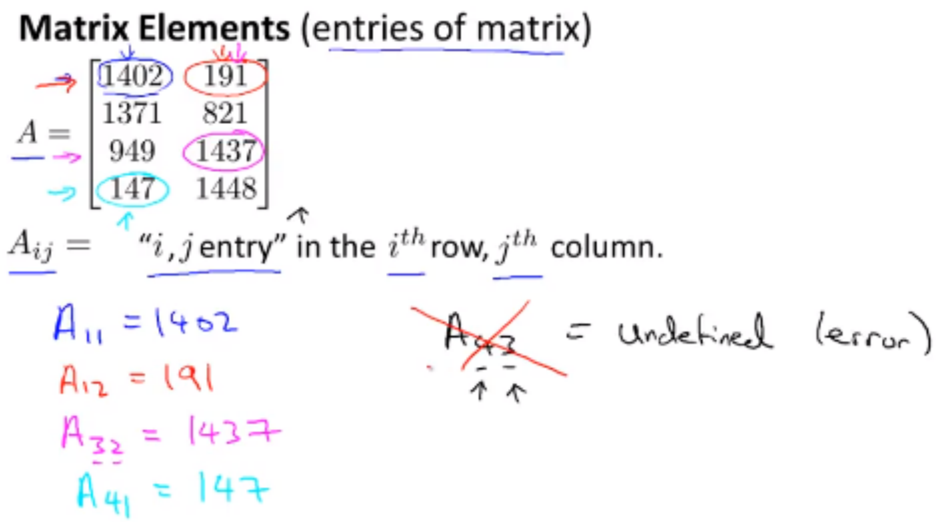
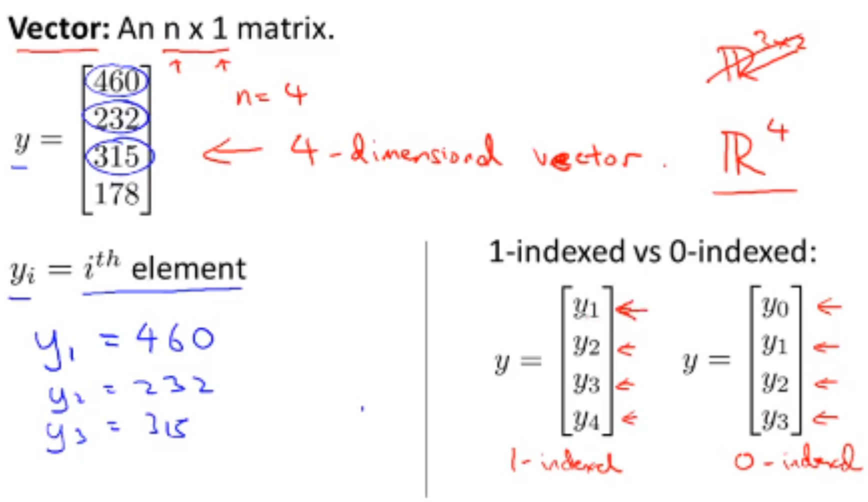
一、矩阵



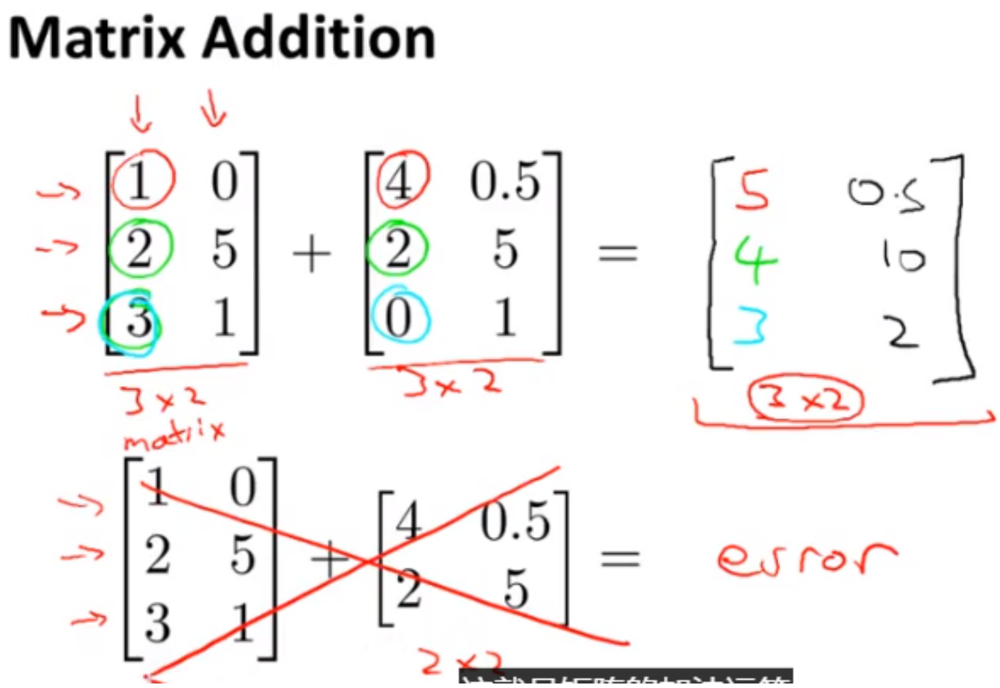
矩阵元素

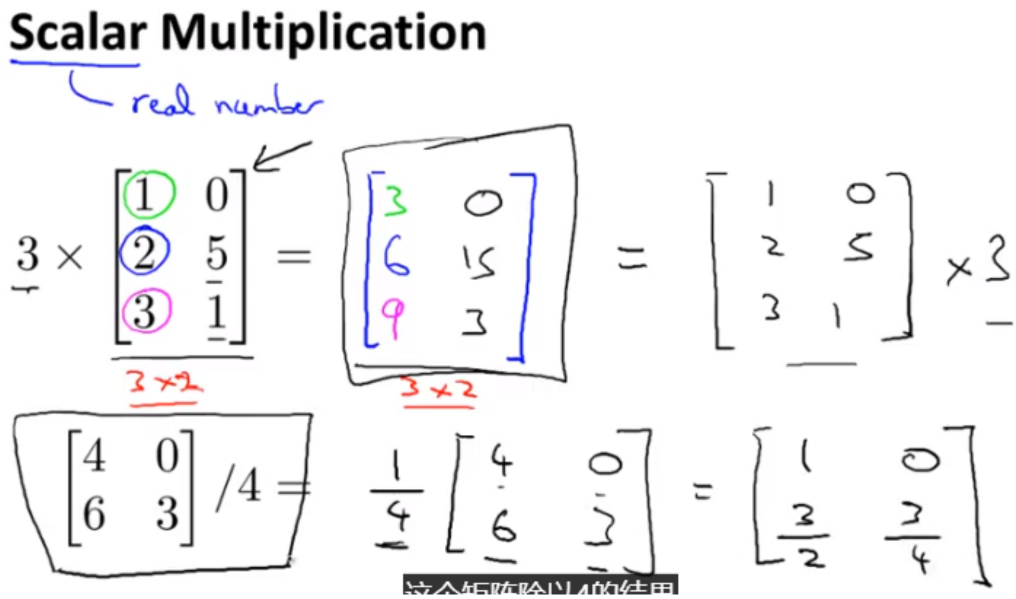


向量

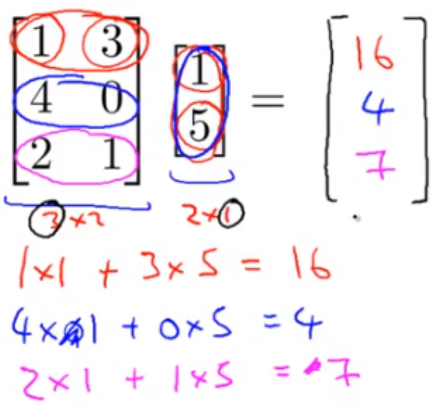


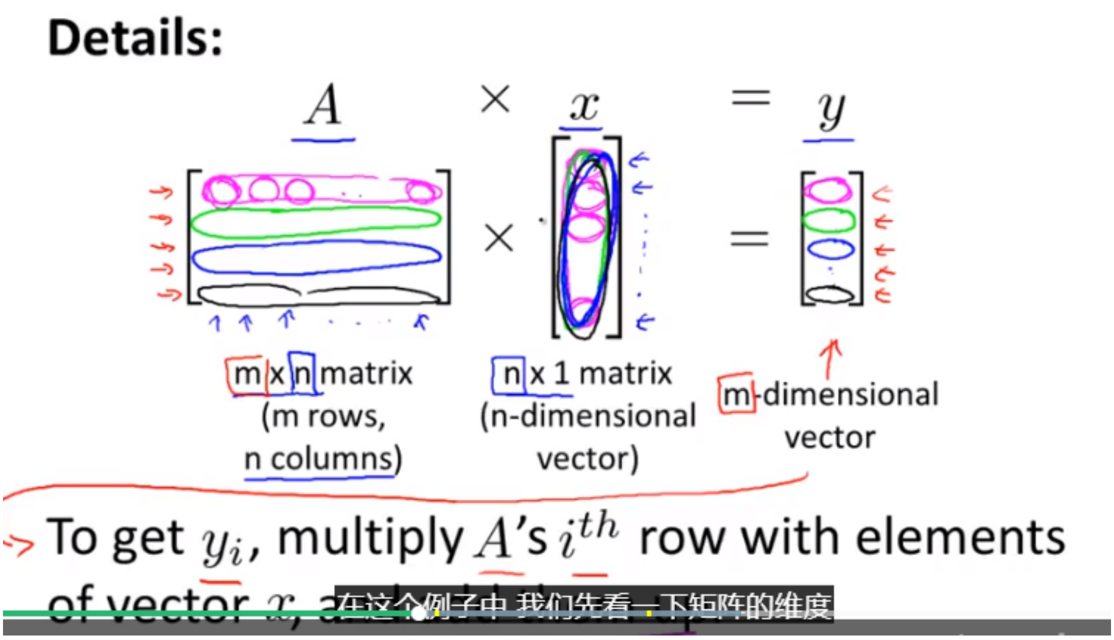
矩阵向量相乘与数组运算

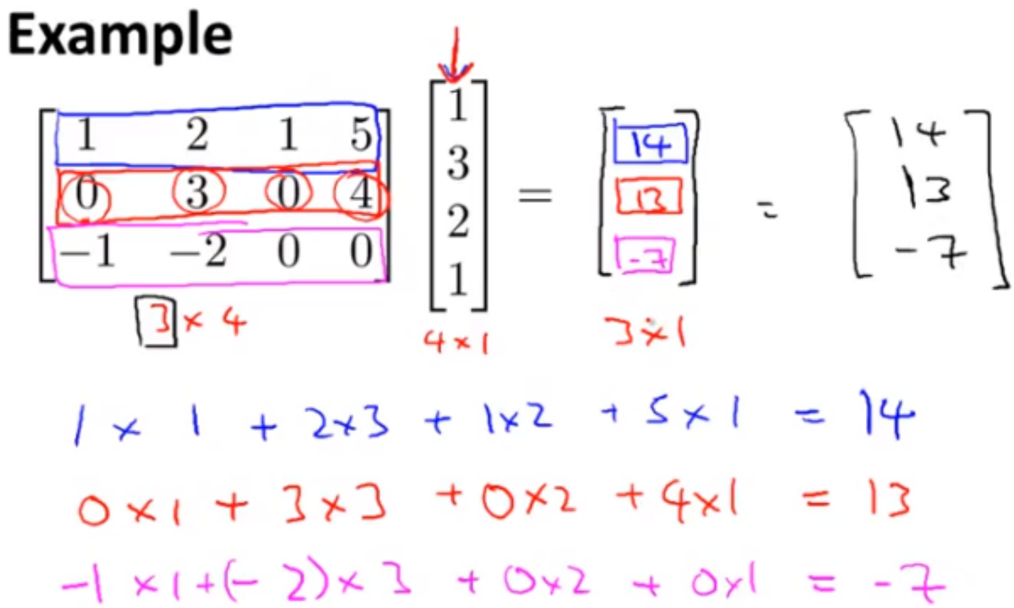

Matrix Addition
$\begin{bmatrix}1&0\\2&5\\3&1\end{bmatrix}+\begin{bmatrix}4&0.5\\2&5\\0&1\end{bmatrix}=\begin{bmatrix}5&0.5\\4&10\\3&2\end{bmatrix}$
3×2 matrix
3×2
3×2
$\begin{bmatrix}1&0\\2&5\\3&1\end{bmatrix}+\begin{bmatrix}4&0.5\\2&5\end{bmatrix}=$ error
2×2


Scalar Multiplication
real number
$3\times\begin{bmatrix}1&0\\2&5\\3&1\end{bmatrix}=\begin{bmatrix}3&0\\6&15\\9&3\end{bmatrix}=\begin{bmatrix}1&0\\2&5\\3&1\end{bmatrix}\times 3$
3×2
3×2
$\begin{bmatrix}4&0\\6&3\end{bmatrix}/4=\frac{1}{4}\begin{bmatrix}4&0\\6&3\end{bmatrix}=\begin{bmatrix}1&0\\\frac{3}{2}&\frac{3}{4}\end{bmatrix}$

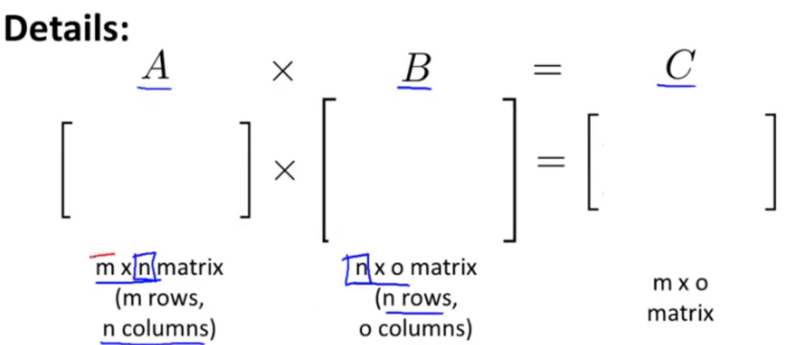
两个矩阵相乘


$\begin{bmatrix}1&3\\4&0\\2&1\end{bmatrix}\begin{bmatrix}1\\5\end{bmatrix}=\begin{bmatrix}16\\4\\7\end{bmatrix}$
3×2
2×1
1×1 + 3×5 = 16
4×1 + 0×5 = 4
2×1 + 1×5 = 7


Details:
A × x = y
m x n matrix
(m rows,
n columns)
n x 1 matrix
(n-dimensional
vector)
m-dimensional
vector
To get y_i, multiply A's i^{th} row with elements
of vector x,
在这个例子中 我们先看一下矩阵的维度


Example
$\begin{bmatrix} 1 & 2 & 1 & 5 \\ 0 & 3 & 0 & 4 \\ -1 & -2 & 0 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 3 \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 14 \\ 13 \\ -7 \end{bmatrix} = \begin{bmatrix} 14 \\ 13 \\ -7 \end{bmatrix}$
3 × 4
4 × 1
3 × 1
1 × 1 + 2×3 + 1×2 + 5×1 = 14
0×1 + 3×3 + 0×2 + 4×1 = 13
-1 ×1+(-2)×3 + 0×2 + 0×1 = -7

矩阵乘法方法：


Details:
A × B = C
m x n matrix
(m rows,
n columns)
n x o matrix
(n rows,
o columns)
m x o
matrix

特殊的矩阵运算

1、 矩阵的逆

2、 转置矩阵