Use_PY_in_Linear_Algebra

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1 Use PY in Linear Algebrea

1.1 Chapter Zero

1. dot product 2. cross product n $n-1$ 3.

1.1.1 python sympy numpy

sympy numpy

sympy `sympy*` `sympydot` `sympycross` `det()inv()adjugate()`

numpy `numpy*arraymatrix` `numpydotmatrixarray` `numpycross` `numpydet()` `.T` `.H` `.J` `.A` 2

1.2 Chapter One Matrix

$m \times nm$(row)n(column) $\mathbf{A}_{2\times3} = \begin{bmatrix} 5 & 2 & 7 \\ 1 & 3 & 4 \end{bmatrix}$ $A2 \times 3A23$ $\mathbf{B}_{4\times4} = \begin{bmatrix} 5 & 2 & 7 & 6 \\ 1 & 3 & 4 & 2 \\ 7 & -1 & 9 & 0 \\ 8 & 2 & -2 & 3 \end{bmatrix}$ $A3A[2,2]a_{2,2}$

`pythonnumpyndarrarymatrix`

```
In [11]: #first method to store the matrix
         import numpy as np

         a = np.matrix('5 2 7;1 3 4')
         b = np.matrix('15 2 7 6;1 3 4 2;7 -1 9 0;8 2 -2 3')
         print(a)#print matrix a
         print(b)#print matrix b
```

```
[[5 2 7]
 [1 3 4]]
[[15  2  7  6]
 [ 1  3  4  2]
 [ 7 -1  9  0]
 [ 8  2 -2  3]]
[[5 2 7]
```

```
 [1 3 4]]
[[15  2  7  6]
 [ 1  3  4  2]
 [ 7 -1  9  0]
 [ 8  2 -2  3]]
```

```
In [12]: #second method to store the matrix
         import numpy as np

         a = np.matrix([[5,2,7],[1,3,4]])
         b = np.matrix([[5,2,7,6],[1,3,4,2],[8,2,-2,3]])
         print(a)#print matrix a
         print(b)#print matrix b
```

```
[[5 2 7]
 [1 3 4]]
[[ 5  2  7  6]
 [ 1  3  4  2]
 [ 8  2 -2  3]]
[[5 2 7]
 [1 3 4]]
[[ 5  2  7  6]
 [ 1  3  4  2]
 [ 8  2 -2  3]]
```

LaTeX matrixndarraygetA()ndarraymatrxasmatrix()

```
In [13]: b = a.getA()#turn a into ndarray
         print(b)
         print(type(b))# the type of b
         c = np.asmatrix(b)
         print(c)
         print(type(c))# the type of c
```

```
[[5 2 7]
 [1 3 4]]
<class 'numpy.ndarray'>
[[5 2 7]
 [1 3 4]]
<class 'numpy.matrixlib.defmatrix.matrix'>
[[5 2 7]
 [1 3 4]]
<class 'numpy.ndarray'>
[[5 2 7]
 [1 3 4]]
<class 'numpy.matrixlib.defmatrix.matrix'>
```