

PYTHON FOR DATA SCIENCE

SCIPY - LINEAR ALGEBRA

CHEAT SHEET PART- 2



SciPy

LINEAR ALGEBRA

You'll use the linalg and sparse modules. Note that scipy.linalg contains and expands on numpy.linalg.

```
>>> from scipy import linalg, sparse
```

Creating Matrices

```
>>> A = np.matrix(np.random.random((2,2)))  
>>> B = np.asmatrix(b)  
>>> C = np.mat(np.random.random((10,5)))  
>>> D = np.mat([[3,4], [5,6]])
```

Basic Matrix Routines

Inverse

>>> A.I	Inverse
>>> linalg.inv(A)	Inverse
>>> A.T	Tranpose matrix
>>> A.H	Conjugate transposition
>>> np.trace(A)	Trace

Norm

>>> linalg.norm(A)	Frobenius norm
>>> linalg.norm(A,1)	L1 norm (max column sum)
>>> linalg.norm (A,np.inf)	L inf norm (max row sum)

Rank

>>> np.linalg.matrix_rank(C)	Matrix rank
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Determinant

>>> linalg.det(A)	Determinant
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Solving linear problems

```
>>> linalg.solve(A,b)
>>> E = np.mat(a).T
>>> linalg.lstsq(D,E)
```

Solver for dense matrices
Solver for dense matrices
Least-squares solution to
linear matrix equation

Generalized inverse

```
>>> linalg.pinv(C)

>>> linalg.pinv2(C)
```

Compute the pseudo-inverse
of a matrix
(least-squares solver)
Compute the pseudo-inverse
of a matrix (SVD)

Creating Sparse Matrices

```
>>> F = np.eye
(3, k=1)
>>> G = np.mat
(np.identity(2))
>>> C[C > 0.5] = 0
>>> H = sparse.csr_
matrix(C)
>>> I = sparse.csc_
matrix(D)
>>> J = sparse.dok_
matrix(A)
>>> sparse.
isspmatrix_csc(A)
```

Create a 2X2 identity matrix

Create a 2x2 identity matrix

Create a 2x2 identity matrix
Compressed Sparse Row
matrix
Compressed Sparse Column
matrix
Dictionary Of Keys matrix

Identify sparse matrix

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