



The QuantEcon MATLAB-Python-Julia Cheat Sheet

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CONTENTS

1	Creating Vectors	2
2	Creating Matrices	3
3	Manipulating Vectors and Matrices	4
4	Accessing vector/matrix elements	5
5	Mathematical Operations	6
6	Sum/Maximum/Minimum	7
7	Input and Output	8

This document summarizes commonly-used, equivalent commands across MATLAB, Python, and Julia

CREATING VECTORS

Operation	MATLAB	Python	Julia
Create a row vector	<code>A = [1 2 3]</code>	<code>A = np.array([1 2 3])</code>	<code>A = [1 2 3]</code>
Create a column vector	<code>A = [1; 2; 3]</code>		<code>A = [1; 2; 3]</code>
Sequence starting at j ending at n, with difference k between points	<code>A = j:k:n</code>		<code>A = j:k:n</code>
Linearly spaced vector of k points	<code>A = linspace(1, 5, k)</code>		<code>A = linspace(1, 5, k)</code>

CREATING MATRICES

Operation	MATLAB	Python	Julia
Create a matrix	<code>A = [1 2; 3 4]</code>		<code>A = [1 2; 3 4]</code>
Create a 2 by 2 matrix of zeros	<code>A = zeros(2, 2)</code>		<code>A = zeros(2, 2)</code>
Create a 2 by 2 matrix of ones	<code>A = ones(2, 2)</code>		<code>A = ones(2, 2)</code>
Create a 2 by 2 identity matrix	<code>A = eye(2, 2)</code>		<code>A = eye(2, 2)</code>
Create a diagonal matrix	<code>A = diag([1 2 3])</code>		<code>A = diagm([1; 2; 3])</code>

MANIPULATING VECTORS AND MATRICES

Operation	MATLAB	Python	Julia
Transpose	<code>A'</code>		<code>A'</code>
Concatenate horizontally	<code>A = [[1 2] [1 2]]</code> or <code>A = horzcat([1 2], [1 2])</code>		<code>A = [[1 2] [1 2]]</code> or <code>A = hcat([1 2], [1 2])</code>
Concatenate vertically	<code>A = [[1 2]; [1 2]]</code> or <code>A = vertcat([1 2], [1 2])</code>		<code>A = [[1 2]; [1 2]]</code> or <code>A = vcat([1 2], [1 2])</code>
Reshape (to 5 rows, 2 columns)	<code>A = reshape(1:10, 5, 2)</code>		<code>A = reshape(1:10, 5, 2)</code>
Convert matrix to vector	<code>A(:)</code>		<code>A[:]</code>
Flip left/right	<code>fliplr(A)</code>		<code>flipdim(A, 2)</code>
Flip up/down	<code>flipud(A)</code>		<code>flipdim(A, 1)</code>
Repeat matrix (3 times in the row dimension, 4 times in the column dimension)	<code>repmat(A, 3, 4)</code>		<code>repmat(A, 3, 4)</code>

ACCESSING VECTOR/MATRIX ELEMENTS

Operation	MATLAB	Python	Julia
Access one element	<code>A(2, 2)</code>		<code>A[2, 2]</code>
Access specific rows	<code>A(1:4, :)</code>		<code>A[1:4, :]</code>
Access specific columns	<code>A(:, 1:4)</code>		<code>A[:, 1:4]</code>
Remove a row	<code>A([1 2 4], :)</code>		<code>A[[1, 2, 4], :]</code>
Diagonals of matrix	<code>diag(A)</code>		<code>diag(A)</code>

MATHEMATICAL OPERATIONS

Operation	MATLAB	Python	Julia
Vector dot product	<code>dot (A, B)</code>		<code>dot (A, B)</code>
Matrix multiplication	<code>A*B</code>		<code>A*B</code>
Element-wise matrix multiplication	<code>A.*B</code>		<code>A.*B</code>
Matrix to a power	<code>A^2</code>		<code>A^2</code>
Matrix to a power, element-wise	<code>A.^2</code>		<code>A.^2</code>
Inverse of a matrix	<code>inv (A)</code> or <code>A^(-1)</code>		<code>inv (A)</code> or <code>A^(-1)</code>
Determinant of a matrix	<code>det (A)</code>		<code>det (A)</code>
Eigenvalues and eigenvectors	<code>[vec, val] = eig(A)</code>		<code>val, vec = eig(A)</code>
Euclidean norm	<code>norm (A)</code>		<code>norm (A)</code>

SUM/MAXIMUM/MINIMUM

Operation	MATLAB	Python	Julia
Sum/maximum/minimum of each column	<code>sum(A, 1)</code> <code>max(A, [], 1)</code> <code>min(A, [], 1)</code>		<code>sum(A, 1)</code> <code>maximum(A, 1)</code> <code>minimum(A, 1)</code>
Sum/maximum/minimum of each row	<code>sum(A, 2)</code> <code>max(A, [], 2)</code> <code>min(A, [], 2)</code>		<code>sum(A, 2)</code> <code>maximum(A, 2)</code> <code>minimum(A, 2)</code>
Sum/maximum/minimum of entire matrix	<code>sum(A(:))</code> <code>max(A(:))</code> <code>min(A(:))</code>		<code>sum(A)</code> <code>maximum(A)</code> <code>minimum(A)</code>
Cumulative sum/maximum/minimum by row	<code>cumsum(A, 1)</code> <code>cummax(A, 1)</code> <code>cummin(A, 1)</code>		<code>cumsum(A, 1)</code> <code>cummax(A, 1)</code> <code>cummin(A, 1)</code>
Cumulative sum/maximum/minimum by column	<code>cumsum(A, 2)</code> <code>cummax(A, 2)</code> <code>cummin(A, 2)</code>		<code>cumsum(A, 2)</code> <code>cummax(A, 2)</code> <code>cummin(A, 2)</code>

INPUT AND OUTPUT

Operation	MATLAB	Python	Julia
Opening a file	<code>fopen('file')</code>	<code>open('file')</code>	<code>open('file')</code>