14.5 CIRCSHIFT Circularly Shift an Array

14.5.1 USAGE

Applies a circular shift along each dimension of a given array. The syntax for its use is

```
y = circshift(x,shiftvec)
```

where `x` is an n-dimensional array, and `shiftvec` is a vector of integers, each of which specify how much to shift `x` along the corresponding dimension.

14.5.2 Example

The following examples show some uses of `circshift` on N-dimensional arrays.

```
--> x = int32(rand(4,5)*10)

x =
  4  8  3  2  9
  0  8  0  5  3
  9  1  5  8  2
  4  5 10  3  7

--> circshift(x,[1,0])

ans =
  4  5 10  3  7
  4  8  3  2  9
  0  8  0  5  3
  9  1  5  8  2

--> circshift(x,[0,-1])

ans =
  8  3  2  9  4
  8  0  5  3  0
  1  5  8  2  9
  5 10  3  7  4

--> circshift(x,[2,2])

ans =
  8  2  9  1  5
  3  7  4  5 10
  2  9  4  8  3
  5  3  0  8  0

--> x = int32(rand(4,5,3)*10)

x =

(:,:,1) =
  2  7  7  3 10
  2  2  3  7  0
  4  8  1  4  0
 10  2  7  8  9
```

```
(:,:,2) =
  5  7 10  9  4
  0  3  5  0  4
  4  5  1  3  6
  9  1  5  1  5

(:,:,3) =
  1  5  6  9  2
  8 10  6  5  7
  6  2  1  6  8
  1  9  6  5  3

--> circshift(x,[1,0,0])

ans =

(:,:,1) =
 10  2  7  8  9
  2  7  7  3 10
  2  2  3  7  0
  4  8  1  4  0

(:,:,2) =
  9  1  5  1  5
  5  7 10  9  4
  0  3  5  0  4
  4  5  1  3  6

(:,:,3) =
  1  9  6  5  3
  1  5  6  9  2
  8 10  6  5  7
  6  2  1  6  8

--> circshift(x,[0,-1,0])

ans =

(:,:,1) =
  7  7  3 10  2
  2  3  7  0  2
  8  1  4  0  4
  2  7  8  9 10

(:,:,2) =
  7 10  9  4  5
  3  5  0  4  0
  5  1  3  6  4
  1  5  1  5  9

(:,:,3) =
  5  6  9  2  1
 10  6  5  7  8
```

```
  2  1  6  8  6
  9  6  5  3  1

--> circshift(x,[0,0,-1])

ans =

(:,:,1) =
  5  7 10  9  4
  0  3  5  0  4
  4  5  1  3  6
  9  1  5  1  5

(:,:,2) =
  1  5  6  9  2
  8 10  6  5  7
  6  2  1  6  8
  1  9  6  5  3

(:,:,3) =
  2  7  7  3 10
  2  2  3  7  0
  4  8  1  4  0
 10  2  7  8  9

--> circshift(x,[2,-3,1])

ans =

(:,:,1) =
  6  8  6  2  1
  5  3  1  9  6
  9  2  1  5  6
  5  7  8 10  6

(:,:,2) =
  4  0  4  8  1
  8  9 10  2  7
  3 10  2  7  7
  7  0  2  2  3

(:,:,3) =
  3  6  4  5  1
  1  5  9  1  5
  9  4  5  7 10
  0  4  0  3  5
```

14.6 COND Condition Number of a Matrix

14.6.1 Usage

Calculates the condition number of a matrix. To compute the 2-norm condition number of a matrix (ratio of largest to smallest singular values), use the syntax