Special Functions & Strings

Lecture: 8 (Dr. Ajeet Kumar)

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Logical Function

ischar(A): Returns 1 if A is a character array otherwise 0

isempty(A): Returns 1 if A is a empty array otherwise 0

isinf(A): Returns an array with same dimension as A with ones where A has "inf" and zero elsewhere.

isnan(A): Returns an array with same dimension as A with ones where A has "NaN" and zero elsewhere.
NaN=>not defined number

isnumeric(A): Returns 1 if A is a numeric array otherwise 0

isreal(A): Return 1 if A has no elements with imaginary parts and 0 otherwise

```
% A=['abc'], isnumeric(A);
A=['string'], B=[2 4], C=ischar(A), D=ischar(B)
```

```
A =
'string'
B = 1×2
     2     4
C = logical
   1
D = logical
   0
```

```
A=[1 2 3; 6 7 8], B=[],C=isempty(A),D=isempty(B)
```

```
A = 2×3
     1     2     3
     6     7     8
B =
     []
C = logical
   0
D = logical
   1
```

```
A=[1 2 3; inf 0 -inf; 45 32 24],B=isinf(A)
```

```
A = 3×3
     1     2     3
   Inf     0  -Inf
    45    32    24
B = 3×3 logical array
   0   0   0
   1   0   1
   0   0   0
```

```
A=[1 0/0 1/0; 3 4 5; 0/0 6 7], B=isnan(A)
```

```
A = 3×3
     1   NaN   Inf
     3     4     5
   NaN     6     7
B = 3×3 logical array
   0   1   0
   0   0   0
   1   0   0
```

```
A=['string'], B=[2 4],isnumeric(A), isnumeric(B)
```

```
A =
'string'
B = 1×2
     2     4
ans = logical
   0
ans = logical
   1
```

```
A=[1 2 3; 4 5 6], B=[2 2+2i;3 4], C=isreal(A),D=isreal(B)
```

```
A = 2×3
     1     2     3
     4     5     6
B = 2×2 complex
   2.0000 + 0.0000i   2.0000 + 2.0000i
   3.0000 + 0.0000i   4.0000 + 0.0000i
C = logical
   1
D = logical
   0
```

Complex Function

abs	Absolute value and complex magnitude
angle	Phase angle
complex	Create complex array
conj	Complex conjugate
i	Imaginary unit
imag	Imaginary part of complex number
j	Imaginary unit
real	Real part of complex number

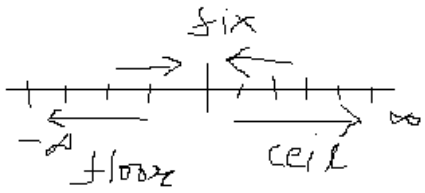
$$z = x + \mathrm{i}y = re^{i\theta}, r = \sqrt{x^2 + y^2}, \theta = \tan^{-1}\left(\frac{y}{x}\right)$$

```
Z=3+10i,real_part=real(Z),imag_part=imag(Z),Conj_Z=conj(Z),angle_Z=angle(Z)
```

```
Z = 3.0000 + 10.0000i
real_part = 3
imag_part = 10
Conj_Z = 3.0000 - 10.0000i
angle_Z = 1.2793
```

Round off Function

ceil	Towards positive infinite
floor	Towards negative infinite
fix	Towards zero
round	Nearest integer




```
%
x=[-1.3 1.3], ceil(x), floor(x),fix(x),round(x)
```

```
x = 1×2
   -1.3000    1.3000
ans = 1×2
    -1     2
ans = 1×2
    -2     1
ans = 1×2
    -1     1
ans = 1×2
    -1     1
```

Character String

A character array is a sequence of characters, just as a numeric array is a sequence of numbers. A typical use is to store a short piece of text as a row of characters in a character vector.

Character string is represented by using '' sign. Each alphabet of the character referred as one element of the vector.

```
% Character string
x='hello'
```

```
x =
'hello'
```

```

```

One can also form matrix of strings. Space is also considered as element of the vector.

```
% Matrix of strings
A=['time';'date';'year']
```

```
A = 3×4 char array
    'time'
    'date'
    'year'
```

```
% B=['hello';'hi';'namskar'];  % This will lead error as first row is having 4-elements, 2nd ro
C=['hello  ';'hi     ';'namskar']   % adding extra space can solve this problem
```

```
C = 3×7 char array
    'hello  '
    'hi     '
    'namskar'
```

```
D=char('hi','hello','namskar')   % 'char' command can use to creat matrix of strings
```

```
D = 3×7 char array
    'hi     '
    'hello  '
    'namskar'
```

Since strings are vectors, relational operation is also applicable on strings. (Explore at your own)

Conversion (number to string)

int2str: Convert integer to string. If number is not an interger, first round the number to nearst integer and then convert into string

```
% integer to string
x=2.4
```

```
x = 2.4000
```

```
int2str(x)
```

```
ans =
'2'
```

num2str: Convert the number into string

```
% number to string
x=2.4
```

```
x = 2.4000
```

```
num2str(x)
```

```
ans =
'2.4'
```