Matlab Array Basics and Miscellaneous

back to Fan's Reusable Matlab Repository or Dynamic Asset Repository.

Compare Array Values That are Approximately Similar

What is the best way to compare floats for almost-equality in Python?

- rel_tol is a relative tolerance, it is multiplied by the greater of the magnitudes of the two arguments; as the values get larger, so does the allowed difference between them while still considering them equal.
- abs_tol is an absolute tolerance that is applied as-is in all cases. If the difference is less than either of those tolerances, the values are considered equal.

```
rel_tol=1e-09;
abs_tol=0.0;
if_is_close = @(a,b) (abs(a-b) <= max(rel_tol * max(abs(a), abs(b)), abs_tol));
disp(['1 and 1, if_is_close:' num2str(if_is_close(1,1))]);
```

```
1 and 1, if_is_close:1
```

```
disp(['1e-300 and 1e-301, if_is_close:' num2str(if_is_close(1e-300,1e-301))]);
```

```
1e-300 and 1e-301, if_is_close:0
```

```
disp(['1+1e-9 and 1+1e-10, if_is_close:' num2str(if_is_close(1+1e-9,1+1e-10))]);
```

```
1+1e-9 and 1+1e-10, if_is_close:1
```

Imaginary Number Examples

```
rng(123);

% Imaginary array
ar_img = rand([1,7]) + 1i*rand([1,7]);

% Regular Array
ar_real = rand([1,10]);

% Combine arrays
ar_full = [ar_real ar_img];
ar_full = ar_full(randperm(length(ar_full)));
disp(ar_full);
```

```
  Columns 1 through 7

   0.6344 + 0.0000i   0.1755 + 0.0000i   0.5316 + 0.0000i   0.2861 + 0.4809i   0.7380 + 0.0000i   0.1825 + 0.0000i

  Columns 8 through 14

   0.2269 + 0.3921i   0.7245 + 0.0000i   0.8494 + 0.0000i   0.6110 + 0.0000i   0.4231 + 0.4386i   0.9808 + 0.0597i

  Columns 15 through 17
```

```
   0.3980 + 0.0000i    0.5513 + 0.3432i    0.7195 + 0.7290i
```

```
% real index
disp(~imag(ar_full));
```

```
  1   1   1   0   1   1   0   0   1   1   1   0   0   1   1   0   0
```

```
% Get Real and not real Components
disp(ar_full(imag(ar_full) == 0));
```

```
   0.6344    0.1755    0.5316    0.7380    0.1825    0.7245    0.8494    0.6110    0.5318    0.3980
```

```
disp(ar_full(imag(ar_full) ~= 0));
```

```
   0.2861 + 0.4809i    0.6965 + 0.6848i    0.2269 + 0.3921i    0.4231 + 0.4386i    0.9808 + 0.0597i    0.5513 + 0.3432i
```