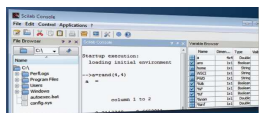


## CISC 3250 Systems Neuroscience

### Scilab: Vectors and Matrices



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JMH 328A

### Reviewing vectors

```
a=[2.2 1.4 -5 3.5 -7.8];
```

- name accesses full vector  
a
- name(index) accesses single element  
a(4) returns 3.5
- name(index1:index2) accesses set of elements  
a(3:\$) returns [-5 3.5 -7.8]

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### Matrices: rows and columns

```
B=[2.2 1.4; -5 3.5; -7.8 4.3];
```

- Spaces/commas separate columns
- Semi-colons (;) separate rows
- name(row,col) accesses single element  
B(2,1) returns -5
- name(:,col) accesses all elements in column  
B(:,2) returns [1.4; 3.5; 4.3]

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### Functions

```
c=[0 3 -2 4];
```

Data are analyzed through functions  
function\_name(input\_variable)

- sum(c) -> 5
- min(c) ->
- max(c) ->
- plot(spike\_record)

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### Non-native functions

- Import a function into Scilab with  
exec('functionName.sci');
- Examples:
  - spikeShow shows spikegram
  - disp2d shows heatmap of 2D matrix
- Save graphics with File -> Export -> [PNG, JPG, GIF, PNG]

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### Finding desired values

```
find(vector<number) find(c<2)
```

#### Comparisons

- d<2, d>2 strict inequality
- d<=2, d>=2 semi-inequality
- d==2 equality

#### Logic combinations

- d>5 & d<8 the AND operation
- d<5 | d>8 the OR operation

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## Creating new vectors and matrices

- `zeros(nRow, nCol)`
- `ones(nRow, nCol)`
- `rand(nRow, nCol)` random numbers  
between 0 and 1

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