A Quick Introduction to Vectors and Loops in MATLAB

Create Vectors

`x = 1:5`	`x` is a row vector containing 1, 2, 3, 4, 5
`y = [0.273 3.05 -2.7 4.222]`	`y` is a row vector
`y = [0.273 3.05 -2.7 4.222]'`	`y` is a column vector
`z = linspace(-1,1)`	`z` is a row vector with 100 values from -1 to 1

Simple operations on Vectors

After the `x` vector has been created, then

`xmax = max(x)`	`xmax` contains the element from `x` with largest positive value
`y = abs(x)`	creates a vector `y` such that $y_i = \|x_i\|$
`xmax = max(abs(x))`	`xmax` contains the element from `x` with largest absolute value
`xbar = mean(x)`	`xbar` contains the average of the values in `x`
`n = length(x)`	`n` is the number of elements in `x`
`s = norm(x)`	`s` is the L_2 norm of elements in `x`. $s = \left[\sum_{i=1}^{n} x_i^2\right]^{1/2}$
`t = sum(x)`	`t` is the sum of the elements in `x`. $t = \sum_{i=1}^{n} x_i$

Access to Elements in a Vectors

After the `x` vector has been created, then

`x(3)`	is the third element of `x`
`x(2) = 7.2`	stores 7.2 in the second element of `x`
`i=3; y(i) = x(i+1)`	stores the value of `x(4)` in `y(3)`.
`i=3; y(i) = sqrt(x(i+1))`	stores the square root of the value of `x(4)` in `y(3)`

Loops with Vectors

Here is a MATLAB function that uses a loop to compute the average of the elements in `x`

```
function xbar = average(x)
% average   Compute the average of the elements in a vector

xsum = 0;
n = length(x)
for i=1:n
  xsum = xsum + x(i);
end
xbar = xsum/n;
```

Note that `i`, `n`, `xbar`, and `xsum` are all *scalar* values, i.e. they are equivalent to matrices with one row and one column.

