

Bioinformatics Summer Institute - Probability/Statistics Workshop

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MatLab Instructions

For the Markov chain problems, we need to do matrix multiplication and compute powers of matrices. For this task we will use Matlab, which is installed on the machines in the lab. Open Matlab.

1. Creating vectors in Matlab:

For a row vector, just type the elements of the vector inside a pair of square brackets, separated by commas or spaces.

```
>>p = [1,0,0,0]
```

To make a column vector, you can either create a row vector and then use the transpose ('), or enter the individual column elements separated by semicolons, in a pair of square brackets.

```
>>pcol = [1,0,0,0]'          or          >> pcol = [1; 0; 0; 0]
```

2. Creating matrices in Matlab:

We combine the two ideas from the vectors. A matrix is entered in square brackets, with elements of a single row separated by commas, and different columns separated by semicolons. To enter for example the matrix

$$A = \begin{pmatrix} 2 & 4 & 10 \\ 16 & 3 & 7 \end{pmatrix}$$

you would enter

```
>>A = [2, 4, 10; 16, 3, 7]
```

3. Matrix multiplication and matrix powers:

The symbol used for regular matrix multiplication is *. To compute

$$\begin{pmatrix} 2 & 4 & 10 \\ 16 & 3 & 7 \end{pmatrix} \cdot \begin{pmatrix} 1 & -1 \\ 2 & 3 \\ 0 & 1 \end{pmatrix}$$

you would enter

```
>>A = [2, 4, 10; 16, 3, 7];
>>B = [1, -1; 2, 3; 0, 1];
>>A * B
```

To compute powers of a matrix, say $A^3 = A \cdot A \cdot A$, you would enter

```
>>A^3
```