Array Addressing

"Array addressing" can be used to "get numbers out of" arrays.

\( a(i) \) refers to the \( i^{th} \) number in an array \( a \) with one row. For example, if

\[
a = [2, 4, 6, \ldots, 100]
\]

then \( a(1) = 2, a(2) = 4, \ldots, a(49) = 98, a(50) = 100 \).

If \( a \) is an array with several rows, then \( a(i,j) \) is the element in the \( i^{th} \) row and \( j^{th} \) column. For example, if

\[
a = \begin{pmatrix}
1 & 3 & 8 \\
2 & 9 & 3 \\
\end{pmatrix}
\]

then \( a(1,2) = 3 \) and \( a(2,1) = 2 \).

We will focus here on arrays with only one row.

Suppose we have an array \( a = [2, 4, 6, \ldots, 100] \)

We can create a new array by "extracting" certain parts of this array:

\[
b = a(3:5) \quad \text{creates an array of the } 3^{rd}, 4^{th}, 5^{th} \text{ elements of } a, \text{ so } b = [6, 8, 10]
\]

\[
c = a(3:5:18) \quad \text{creates an array consisting of the } 3^{rd}, 8^{th}, 13^{th}, \text{ and } 18^{th} \text{ elements of } a \quad \text{("go from 3 to 18 with stepsize 5"), so } c = [6, 16, 26, 36]. \quad \text{In the preceding example, the stepsize is assumed to be 1.}
\]

\[
d = a(6:-2:2) \quad \text{creates } d \text{ using the } 6^{th}, 4^{th}, \text{ and } 2^{nd} \text{ elements of } a, \text{ so } d = [12, 8, 4]
\]

\[
e = a([3 7 8]) \quad \text{creates } e \text{ using the } 3^{rd}, 7^{th}, \text{ and } 8^{th} \text{ elements of } a, \text{ so } e = [6, 14, 16]
\]

Example. Suppose \( a = \text{linspace}(0,6,4) = [0, 2, 4, 6] \). The numbers in \( a \) can be thought of as the endpoints of the subintervals we get when we divide the interval \([0, 6]\) into 3 equal subintervals.

We can the define the array of left endpoints using \( \text{left} = a(1:3) = [0, 2, 4] \) and the array of right endpoints by \( \text{right} = a(2:4) = [2, 4, 6] \).