The Colon Operator

The colon, :, is one of the most important MATLAB operators. It occurs in several different forms. The expression

\[ 1:10 \]

is a row vector containing the integers from 1 to 10:

\[
\begin{array}{cccccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\
\end{array}
\]

To obtain nonunit spacing, specify an increment. For example,

\[ 100:-7:50 \]

is

\[
\begin{array}{cccccccccc}
100 & 93 & 86 & 79 & 72 & 65 & 58 & 51 \\
\end{array}
\]

and

\[ 0:pi/4:pi \]

is

\[
\begin{array}{cccccccc}
0 & 0.7854 & 1.5708 & 2.3562 & 3.1416 \\
\end{array}
\]

Subscript expressions involving colons refer to portions of a matrix:

\[ A(1:k,j) \]

is the first \( k \) elements of the \( j \)th column of \( A \). So

\[ \text{sum}(A(1:4,4)) \]

computes the sum of the fourth column. But there is a better way. The colon by itself refers to all the elements in a row or column of a matrix and the keyword \texttt{end} refers to the last row or column. So

\[ \text{sum}(A(:,end)) \]

computes the sum of the elements in the last column of \( A \):
 why is the magic sum for a 4-by-4 square equal to 34? If the integers from 1 to 16 are sorted into four groups with equal sums, that sum must be

\[ \frac{\text{sum}(1:16)}{4} \]

which, of course, is

\[ \text{ans} = 34 \]