```
B =
    10     8     6     5     4
     2     6    10    12    14
```

2.7 ADDING ELEMENTS TO EXISTING VARIABLES

A variable that exists as a vector, or a matrix, can be changed by adding elements to it (remember that a scalar is a vector with one element). A vector (a matrix with a single row or column) can be changed to have more elements, or it can be changed to be a two-dimensional matrix. Rows and/or columns can also be added to an existing matrix to obtain a matrix of different size. The addition of elements can be done by simply assigning values to the additional elements, or by appending existing variables.

Adding elements to a vector:

Elements can be added to an existing vector by assigning values to the new elements. For example, if a vector has 4 elements, the vector can be made longer by assigning values to elements 5, 6, and so on. If a vector has *n* elements and a new value is assigned to an element with an address of *n*+2 or larger, MATLAB assigns zeros to the elements that are between the last original element and the new element. Examples:

```
>> DF=1:4                                  Define vector DF with 4 elements.
DF =
    1     2     3     4
>> DF(5:10)=10:5:35          Adding 6 elements starting with the 5th.
DF =
    1     2     3     4    10    15    20    25    30    35
>> AD=[5  7  2]                          Define vector AD with 3 elements.
AD =
    5     7     2
>> AD(8)=4                                 Assign a value to the 8th element.
AD =                                    MATLAB assigns zeros to
    5    7    2    0    0    0    0    4  the 4th through 7th elements.
>> AR(5)=24            Assign a value to the 5th element of a new vector.
AR =                                    MATLAB assigns zeros to the
    0     0     0     0    24            1st through 4th elements.
>>
```

Elements can also be added to a vector by appending existing vectors. Two examples are:

```
>> RE=[3  8 1  24];                      Define vector RE with 4 elements.
```

```
>> GT=4:3:16;
>> KNH=[RE  GT]
KNH =
    3    8    1   24    4    7   10   13   16
>> KNV=[RE'; GT']
KNV =
     3
     8
     1
    24
     4
     7
    10
    13
    16
```

Define vector GT with 5 elements.

Define a new vector KNH by appending RE and GT.

Create a new column vector KNV by appending RE' and GT'.

Adding elements to a matrix:

Rows and/or columns can be added to an existing matrix by assigning values to the new rows or columns. This can be done by assigning new values, or by appending existing variables. This must be done carefully since the size of the added rows or columns must fit the existing matrix. Examples are:

```
>> E=[1 2 3 4; 5 6 7 8]
E =
     1     2     3     4
     5     6     7     8
>> E(3,:)=[10:4:22]
E =
     1     2     3     4
     5     6     7     8
    10    14    18    22
>> K=eye(3)
K =
     1     0     0
     0     1     0
     0     0     1
>> G=[E  K]
G =
     1     2     3     4     1     0     0
     5     6     7     8     0     1     0
    10    14    18    22     0     0     1
```

Define a 2×4 matrix E.

Add the vector 10 14 18 22 as the third row of E.

Define a 3×3 matrix K.

Append matrix K to matrix E. The numbers of rows in E and K must be the same.