```
bb =
     3
     8
     1
>> C=[2 55 14 8; 21 5 32 11; 41 64 9 1]
C =
     2    55    14     8
    21     5    32    11
    41    64     9     1
>> D=C'
D =
     2    21    41
    55     5    64
    14    32     9
     8    11     1
>>
```

Define a matrix C with 3 rows and 4 columns.

Define a matrix D as the transpose of matrix C. (D has 4 rows and 3 columns.)

2.5 ARRAY ADDRESSING

Elements in an array (either vector or matrix) can be addressed individually or in subgroups. This is useful when there is a need to redefine only some of the elements, when specific elements are to be used in calculations, or when a subgroup of the elements is used to define a new variable.

2.5.1 Vector

The address of an element in a vector is its position in the row (or column). For a vector named ve, ve(k) refers to the element in position k. The first position is 1. For example, if the vector ve has nine elements:
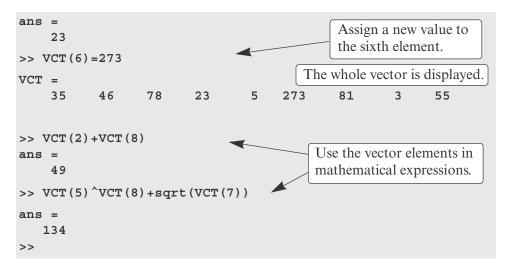
ve = 35 46 78 23 5 14 81 3 55

then

$ve(4) = 23$, $ve(7) = 81$, and $ve(1) = 35$.

A single vector element, $v(k)$, can be used just as a variable. For example, it is possible to change the value of only one element of a vector by assigning a new value to a specific address. This is done by typing: $v(k) = value$. A single element can also be used as a variable in a mathematical expression. Examples are:

```
>> VCT=[35 46 78 23 5 14 81 3 55]
VCT =
    35    46    78    23     5    14    81     3    55
>> VCT(4)
```

Define a vector.

Display the fourth element.

```
ans =
    23
>> VCT(6)=273

VCT =
    35    46    78    23     5   273    81     3    55


>> VCT(2)+VCT(8)
ans =
    49
>> VCT(5)^VCT(8)+sqrt(VCT(7))

ans =
   134
>>
```

Assign a new value to the sixth element.

The whole vector is displayed.

Use the vector elements in mathematical expressions.

2.5.2 Matrix

The address of an element in a matrix is its position, defined by the row number and the column number where it is located. For a matrix assigned to a variable *ma*, *ma*(*k*,*p*) refers to the element in row *k* and column *p*.

For example, if the matrix is: $\quad ma = \begin{vmatrix} 3 & 11 & 6 & 5 \\ 4 & 7 & 10 & 2 \\ 13 & 9 & 0 & 8 \end{vmatrix}$

then *ma*(1,1) = 3 and *ma*(2,3) = 10.

As with vectors, it is possible to change the value of just one element of a matrix by assigning a new value to that element. Also, single elements can be used like variables in mathematical expressions and functions. Some examples are:

```
>> MAT=[3 11 6 5; 4 7 10 2; 13 9 0 8]

MAT =
     3    11     6     5
     4     7    10     2
    13     9     0     8
>> MAT(3,1)=20

MAT =
     3    11     6     5
     4     7    10     2
    20     9     0     8
>> MAT(2,4)-MAT(1,2)

ans =
    -9
```

Create a 3 × 4 matrix.

Assign a new value to the (3,1) element.

Use elements in a mathematical expression.