Course N°02

Vectors in

MATLAB

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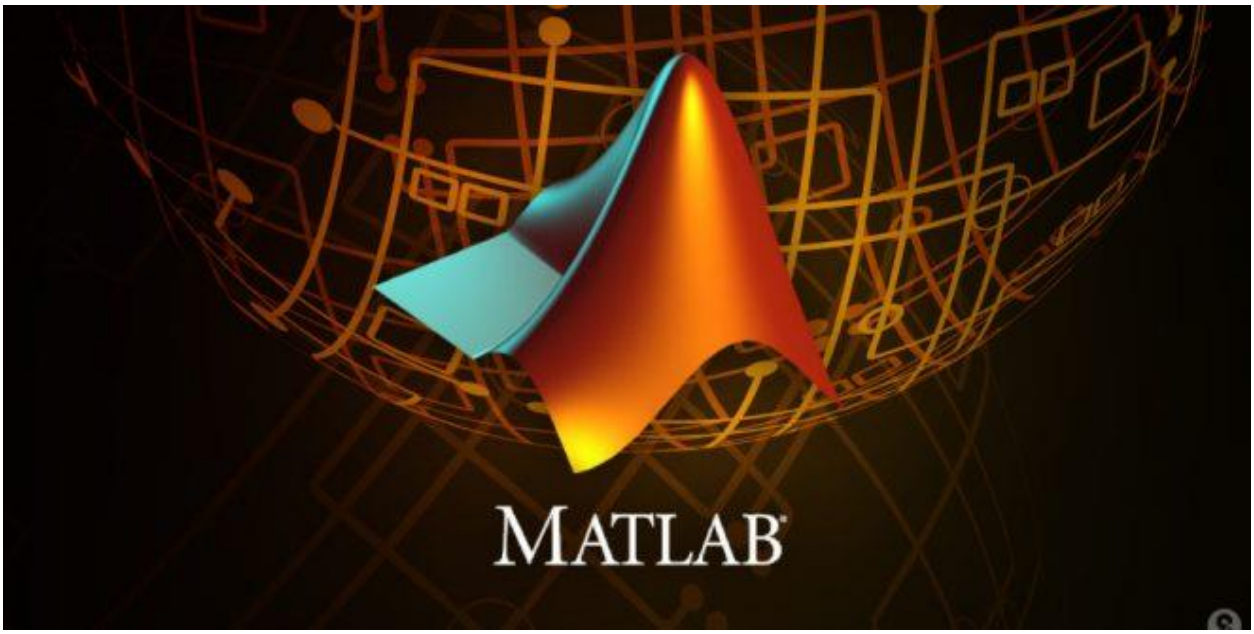


Dr. Salah Djerouni

1. Vector operations

In this section, let us discuss the following **vector operations**

Addition and subtraction of vectors

Multiplication of vector

Division of vector

Power of vector, and

Transpose of vector

Besides the standard **vector operations**, **MATLAB** performs an element-by-element array operations (**addition**, **subtraction**, **multiplication**, **division**, and **power**) among vectors of the **same dimensions**. To illustrate this **special feature**, consider **two vectors**, **a** and **b**, of **n=3** elements.

2.1. Addition of vectors

You can **add two vectors**. Both **vectors** must have the **same number** of elements (the same dimension/ size).

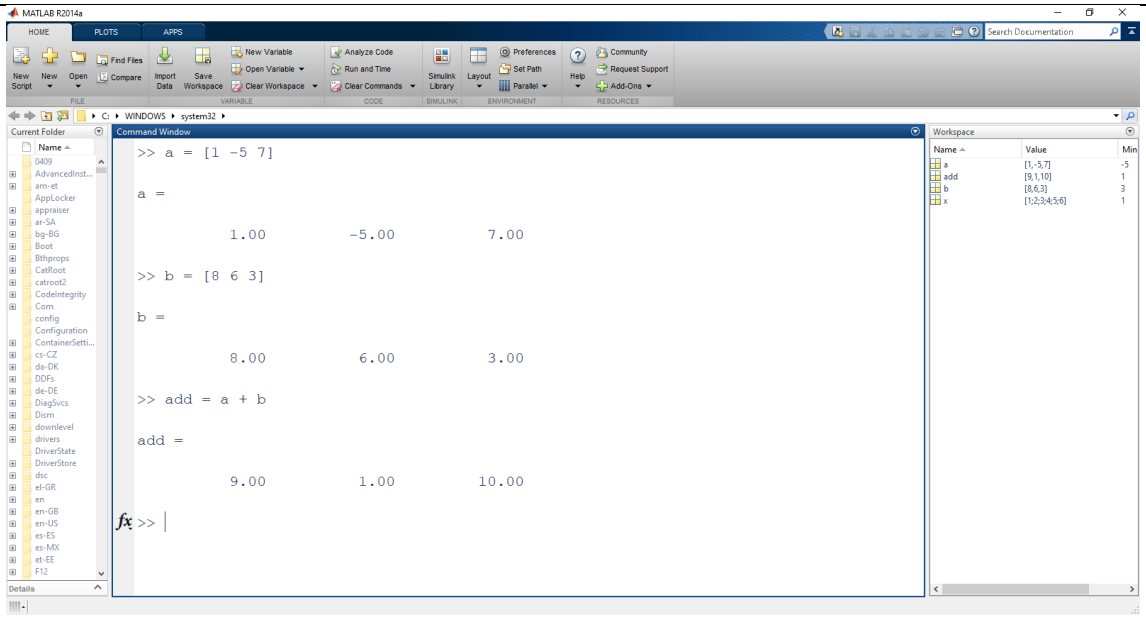


Fig 1. The sum of two vectors *a* and *b*

2.2. Subtraction of vectors

Is the **difference between two given vectors**, whose defined in **MATLAB** by the following way

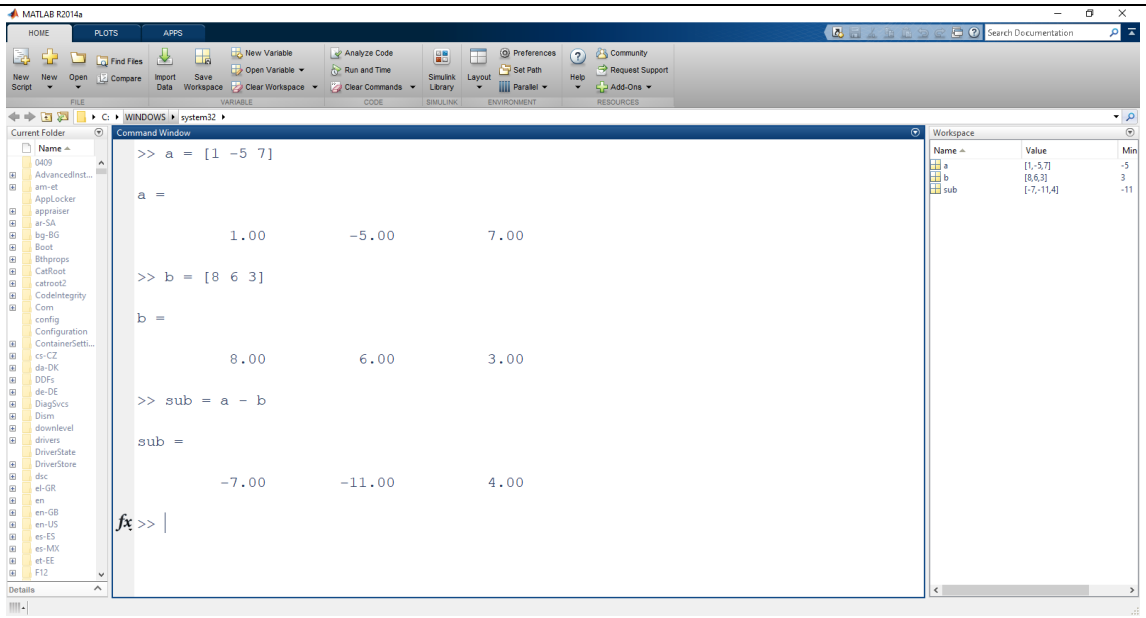


Fig 2. The difference between two vectors *a* and *b*

2.3. Multiplication of vectors

It distinguishes between **vectorial product** and **scalar product**:

Vectorial product is the **multiplying** of **two given vectors element-by-element** whose defined in **MATLAB** by the following way.

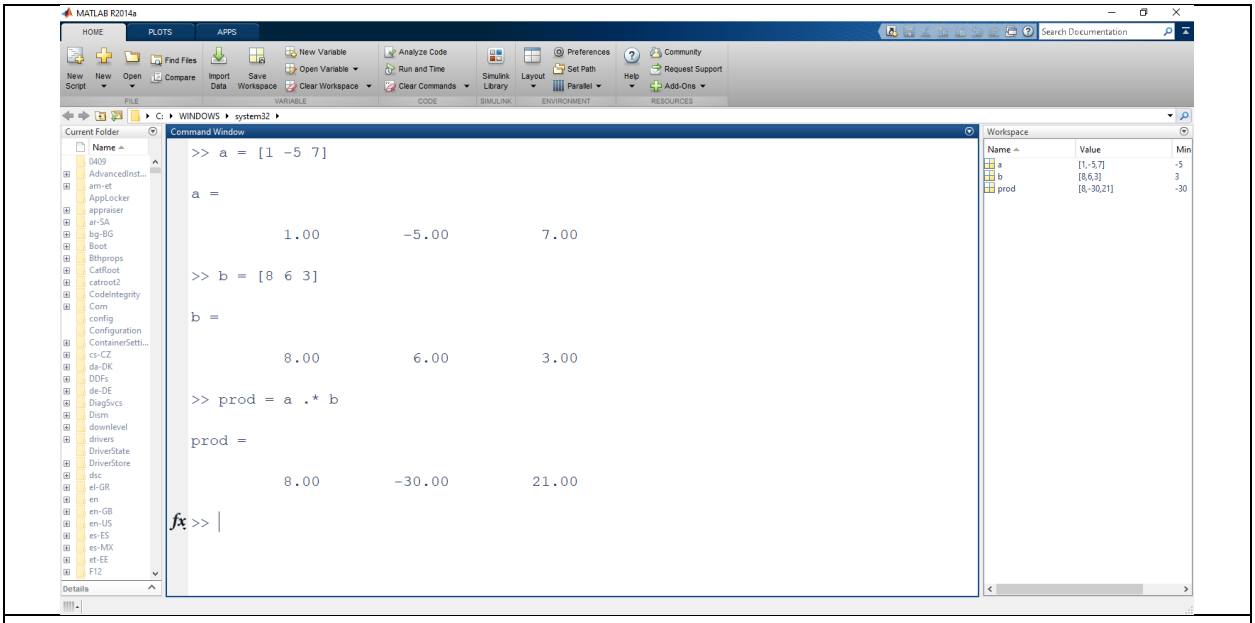


Fig 3. The multiplication of two vectors *a* and *b* (element by element)

Scalar product is the **multiplying** of **two given vectors row-by-column** whose defined in **MATLAB** by the following way.

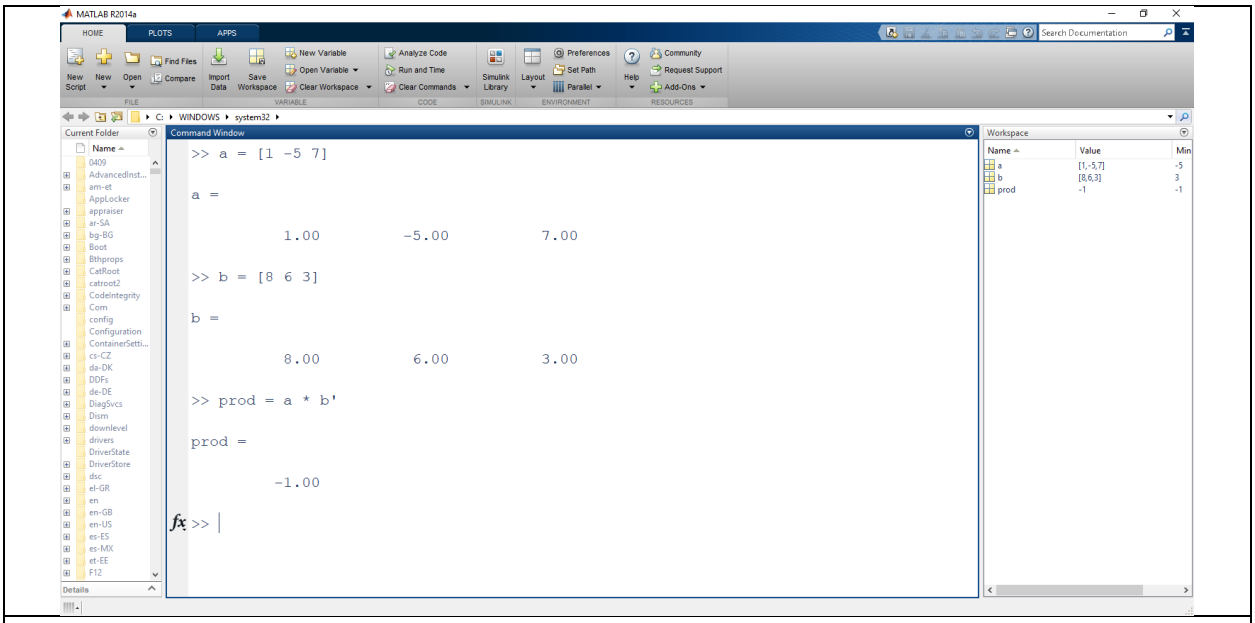


Fig 4. The multiplication of two vectors *a* and *b* (row vector and column vector)

2.4. Division of vectors

Is the **division** of **two given vectors element-by-element**, whose defined in **MATLAB** by the following way

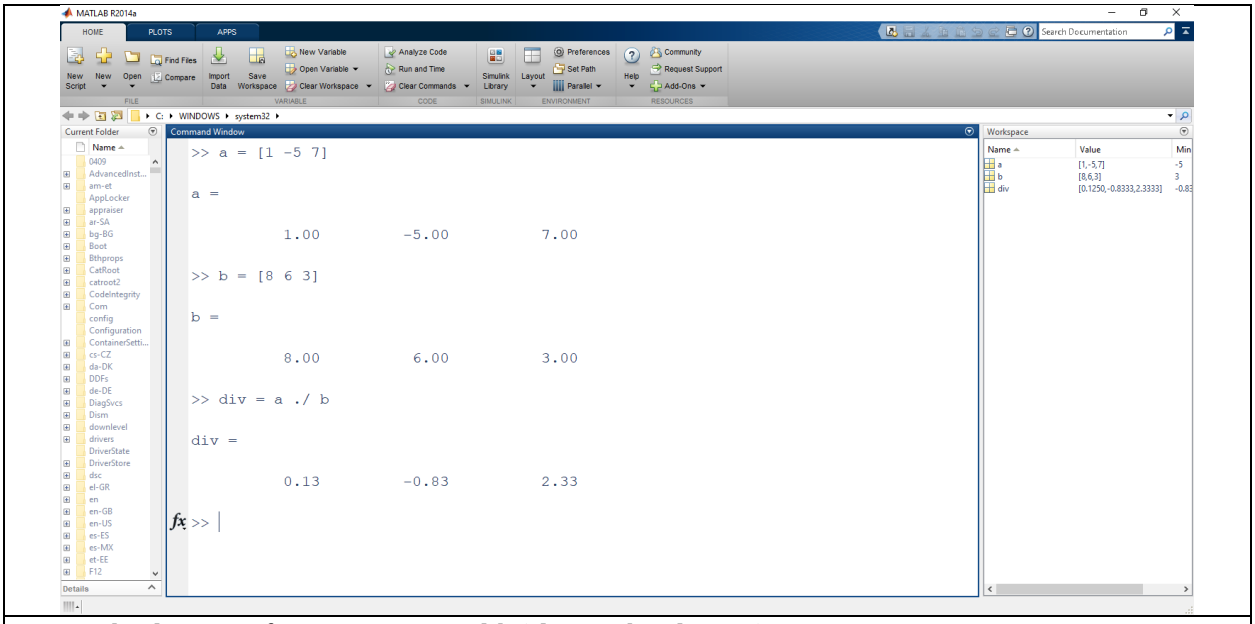


Fig 5. The division of two vectors *a* and *b* (element by element)

3. Other useful MATLAB functions

3.1. Display single value from vector

In order to **show** or **peak** or **extract** or **display** single value from vector already written by MATLAB, we need to know the **position** or the **order** of that element in the vector

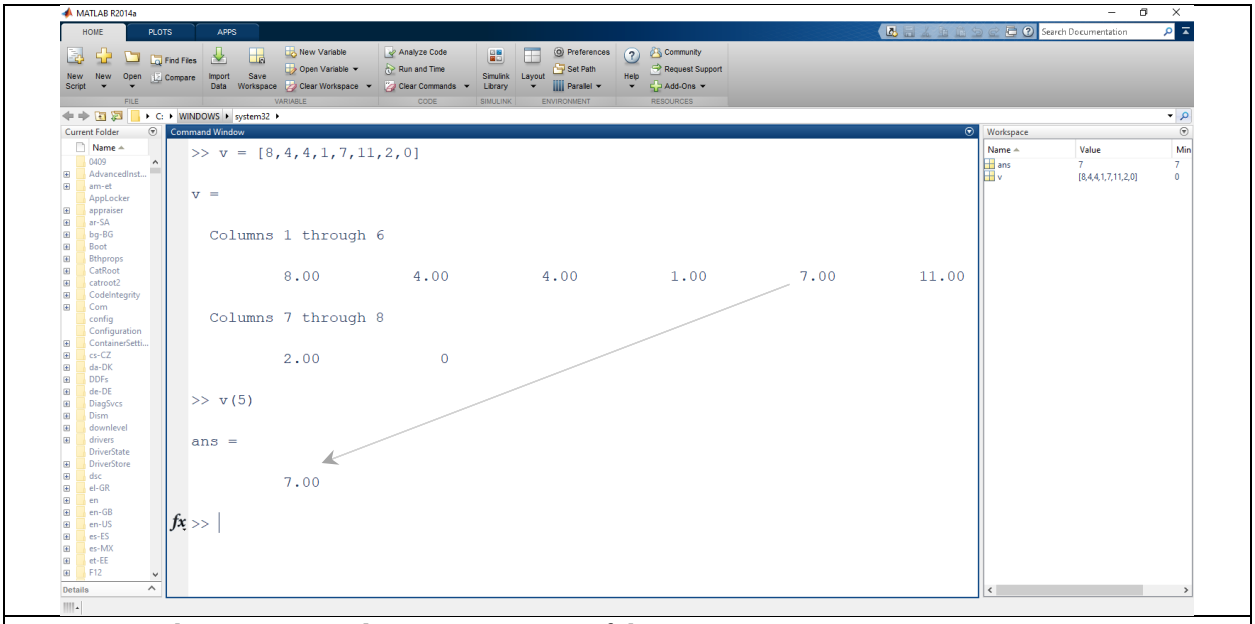


Fig 6. To peak or extract a value in any position of the vector *v*

3.2. Replace single value from vector

In case we want to **replace** the recent value, we peak from the vector with another value

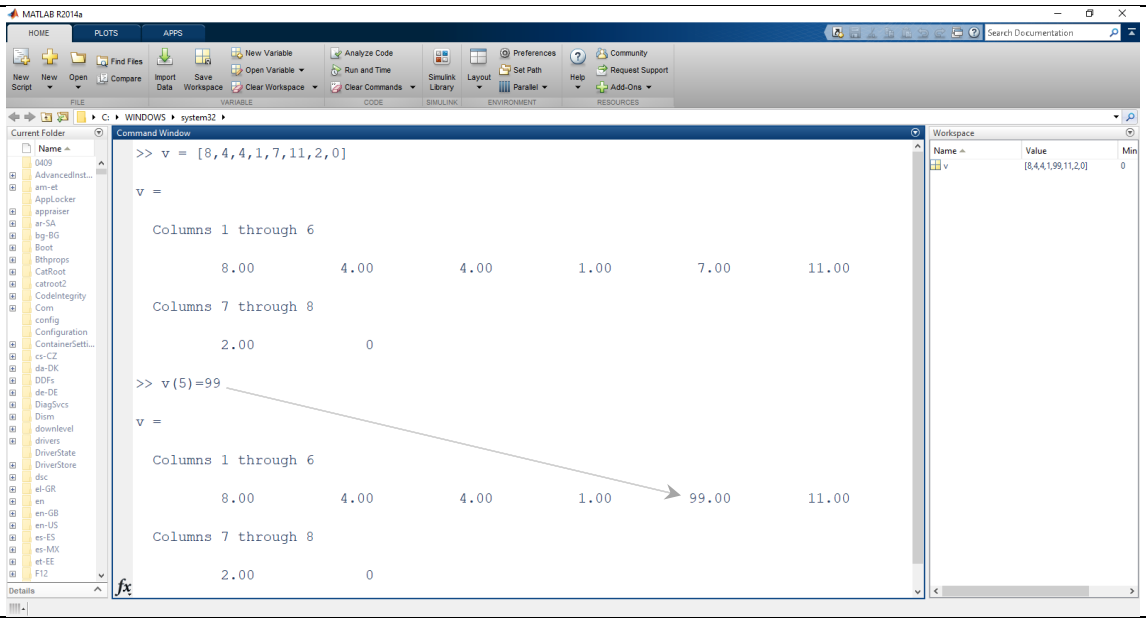


Fig 7. To replace a value in position of the vector *v*

3.3. Display multiple values from vector

To **show** or **peak** or **extract** more than one value from that vector already given, we need to use brackets [ ] inside the parenthesis **( )**

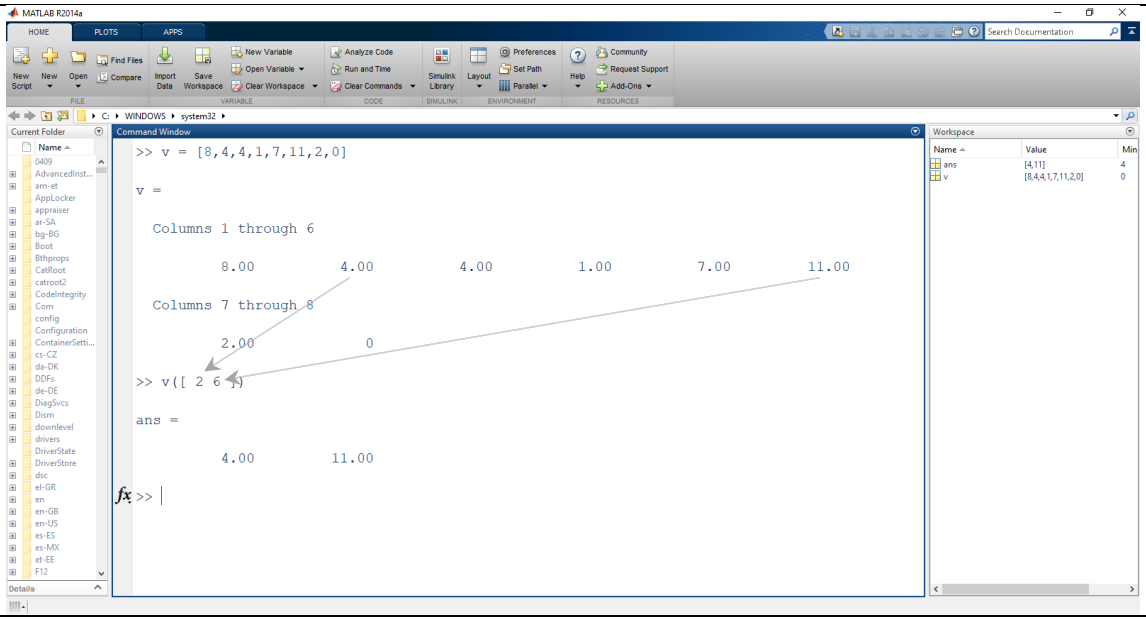


Fig 8. To peak or extract multiple values in any position of the vector *v*

3.4. Replace multiple values from vector

In case we want to replace in two position different the same value

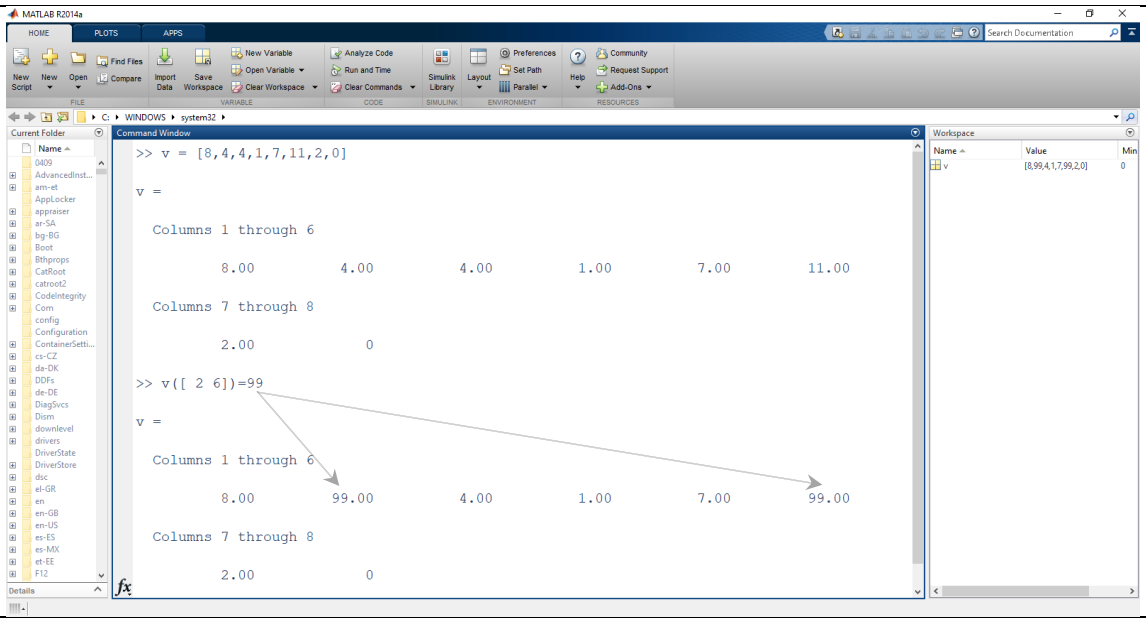


Fig 9. To replace one or same value in more than one position of the vector *v*

To this end, in case we want to replace in two position different two values different of a given vector written by MATLAB

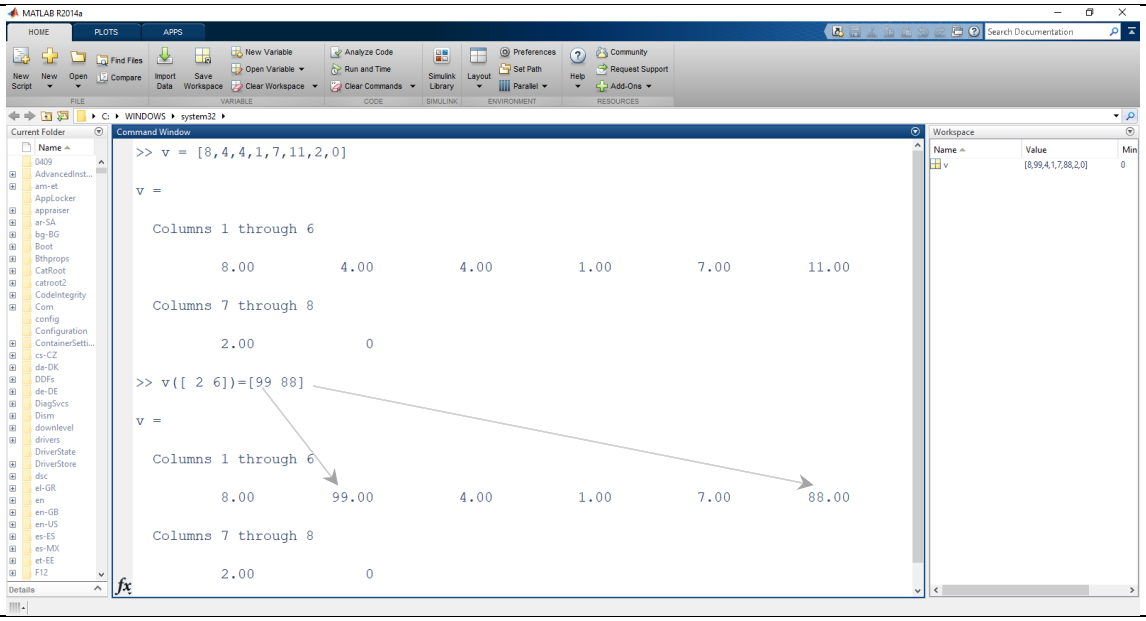


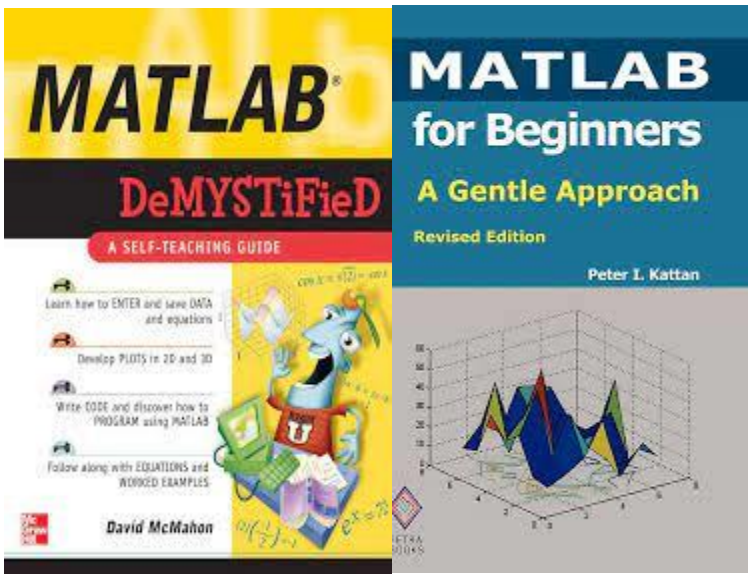
Fig 10. To replace more than one value in more different position of the vector *v*

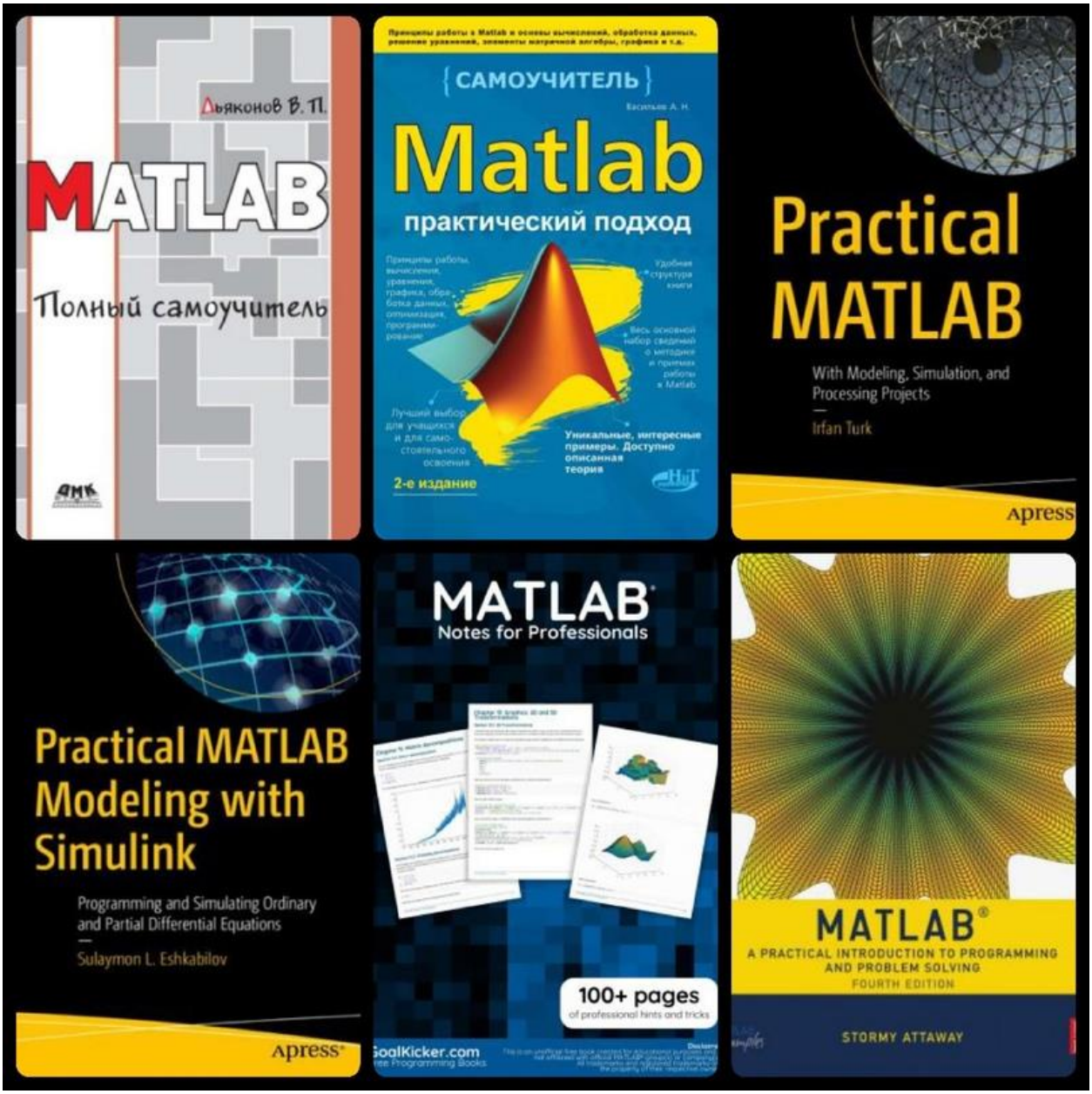
List of References

MATLAB A Practical Introduction to Programming and Problem Solving

MATLAB A Self-Teaching Guide

MATLAB for Beginners

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