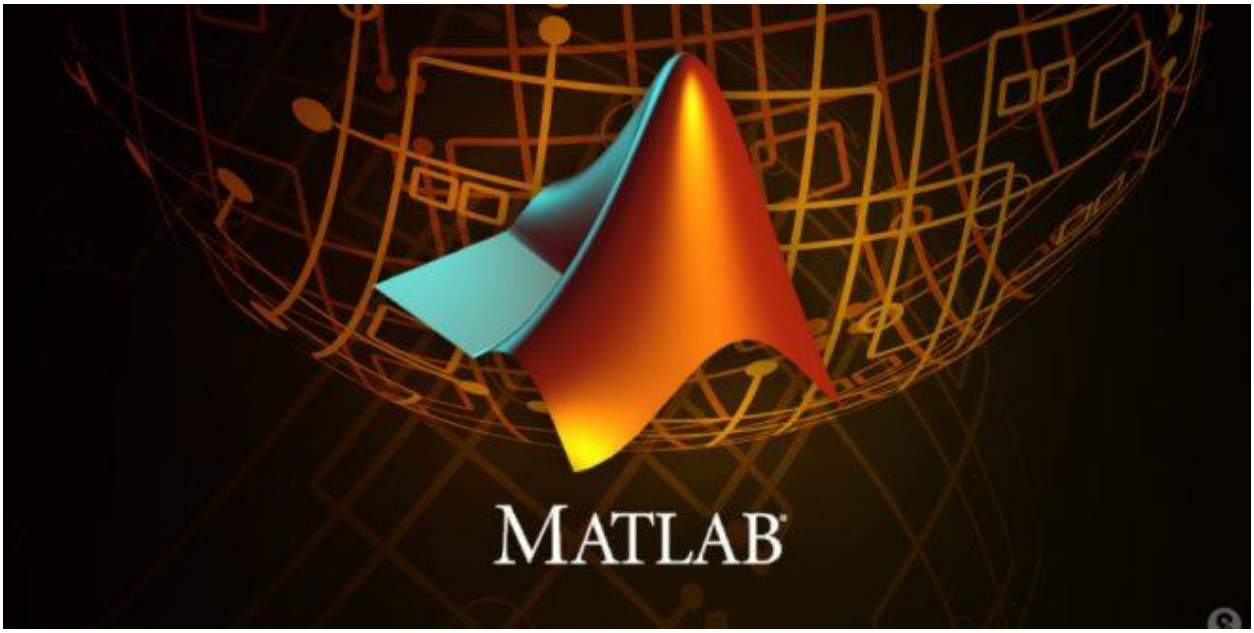
Course N°02

Vectors in

MATLAB



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1. Definition a vector

By default, a vector is a **one-dimensional** array of numbers. In other words, it is a single row with several columns or a single column with several rows.

2. Different methods to identify a vector

Before we identify a vector in **MATLAB**, we must know if the vector:

2.1. Random vector

MATLAB allows you to create an arbitrary vector or called (irregular, random) vector in three ways, containing different numbers.

•Each element in the vector with the order

•All the elements inside a **square bracket []** and between each element and the other **space**

•All the elements inside a **square bracket []** and between each element and the other **comma** ”,”

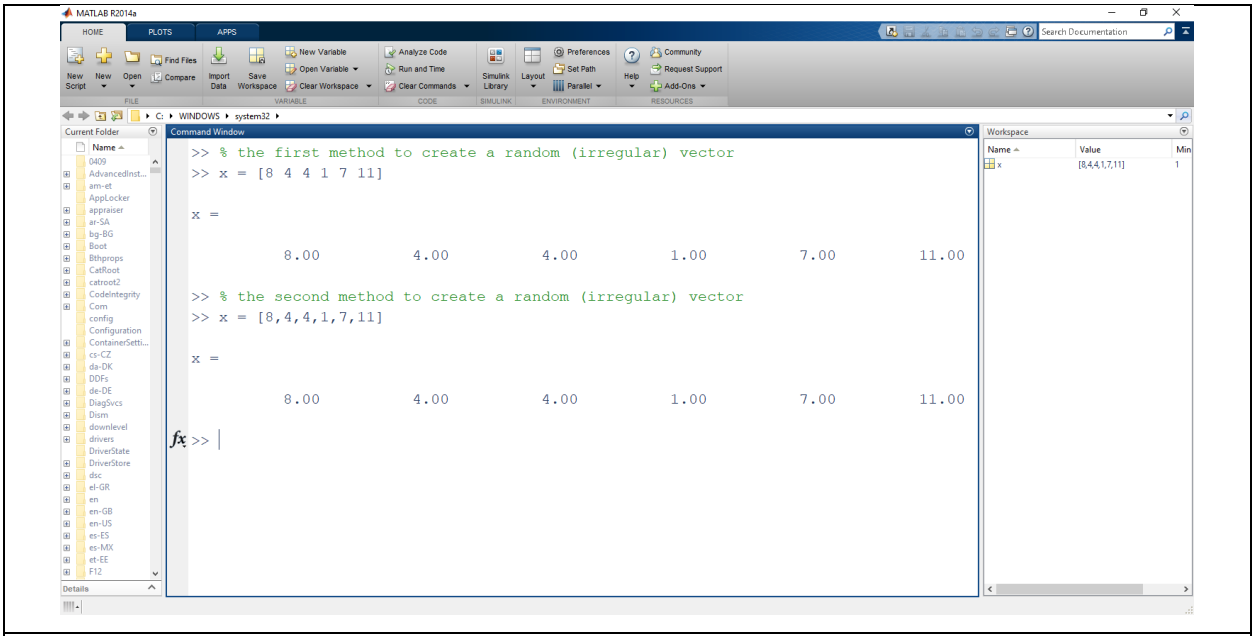


Fig 1. Different methods to create an irregular (random) vector

2.2. Regular vector

MATLAB allows you to create a uniformly spaced vector called a **proper (regular)** vector in **two ways**.

- Using the function/command **linspace(Xi , Xf , N)**; which generates **N** points between **Xi** and **Xf**.

- Using the function/command **v = Xi : St : Xf**; which generates v vector, with the **first** element **Xi**, **last** element **Xf**, and the difference between elements is any real number **St**.

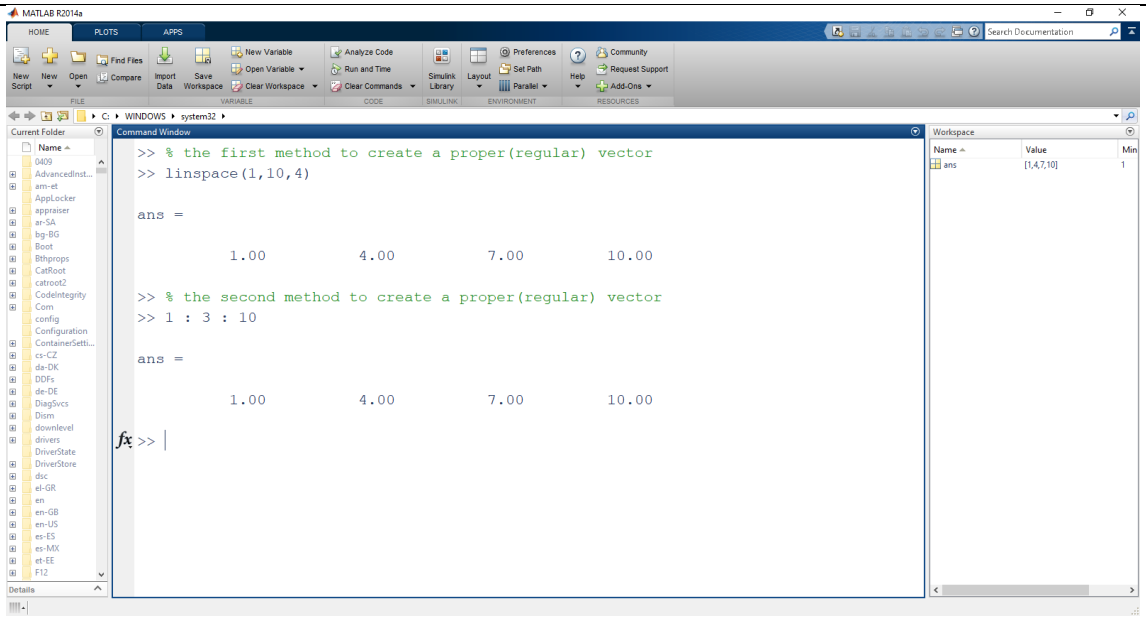


Fig 2. Two methods to create a regular vector

3. Types of the vectors

MATLAB allows you to create **two types** of **vectors** which can be stored either:

A row vectors and

A column vectors.

3.1. Row vectors

Are **created** and/or **declared** by **enclosing** the set of elements in **square brackets**, using **space** or **comma** "**,**" to **delimit** the **elements**, which can have any number of elements. For example, there are **two ways** to **create** a **row vector** with **six elements**.

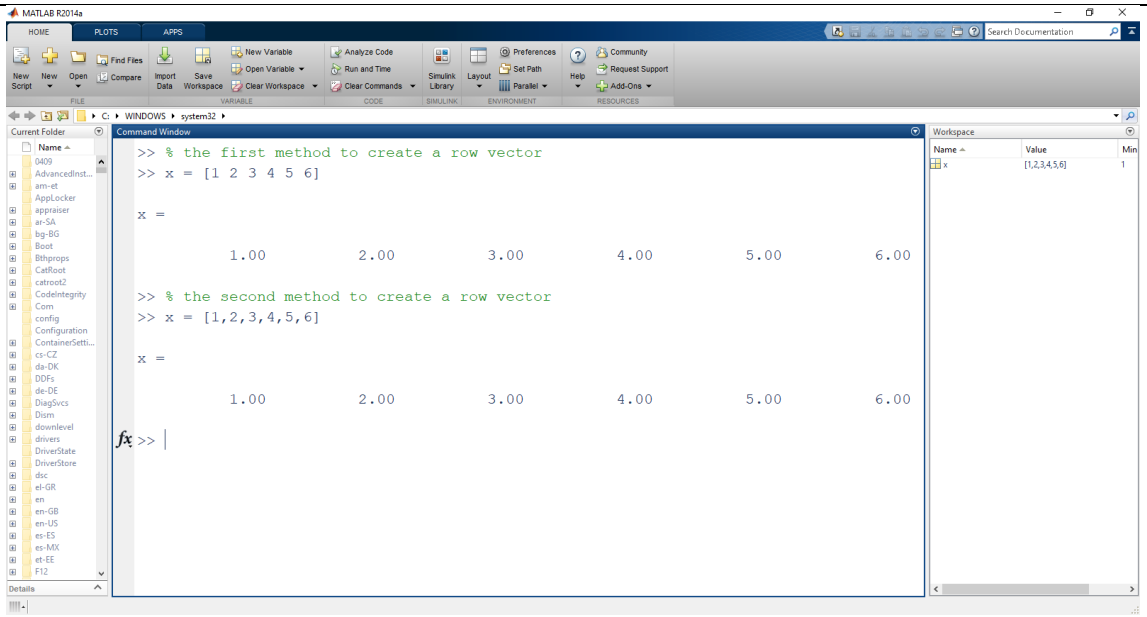


Fig 3. Two ways to create a row vectors

3.2. Column vectors

Are **created** and/or **declared** by **enclosing** the set of elements in **square brackets**, using a **semicolon** "**;**" to **delimit** the **elements**. For example, there is **one way** to create a **column vector** with **five elements**.

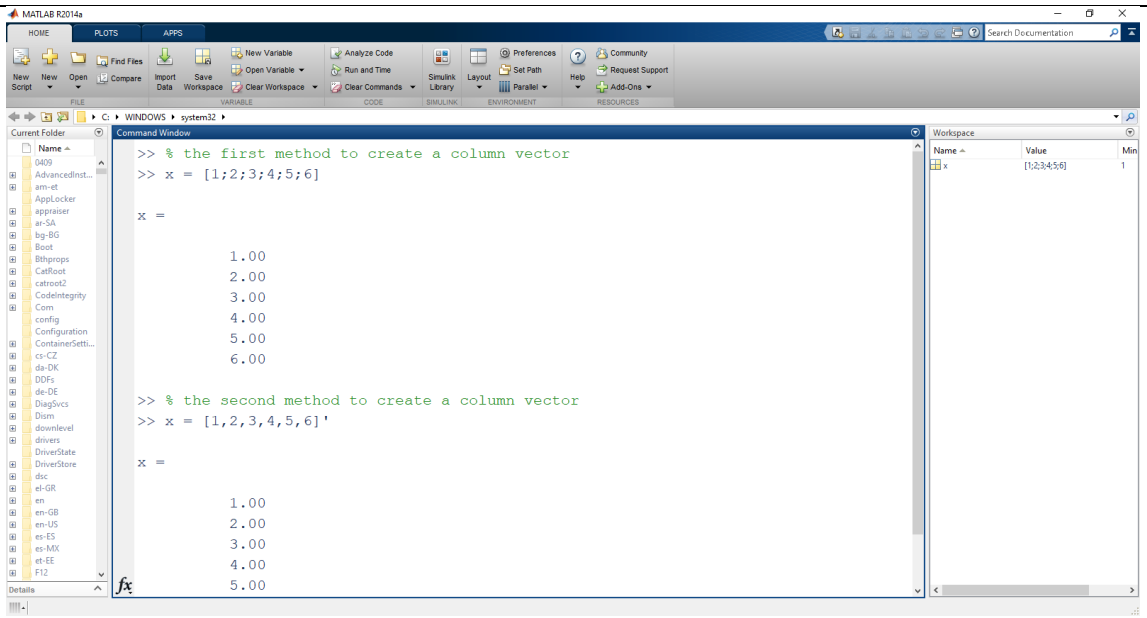


Fig 4. Two ways to create a column vectors

4. Other useful MATLAB functions

For vectors, to find the **maximum** and **minimum** values of the vector **x**, we use the command/function **max(.)** and **min(.)**

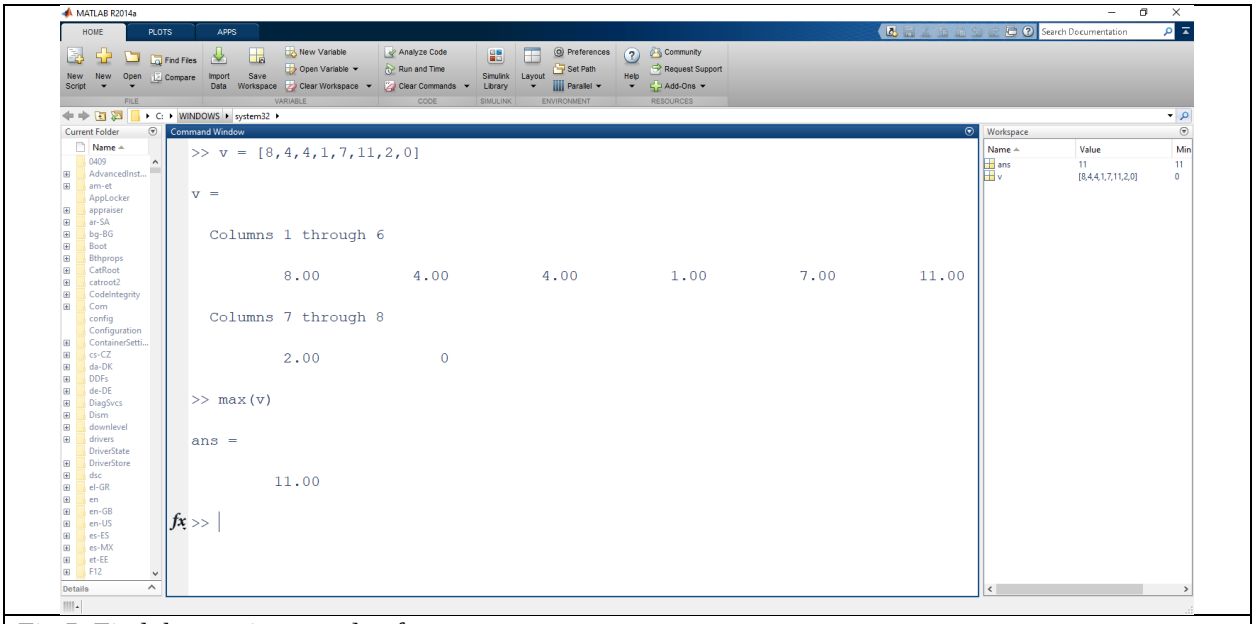


Fig 5. Find the maximum value from a vector v

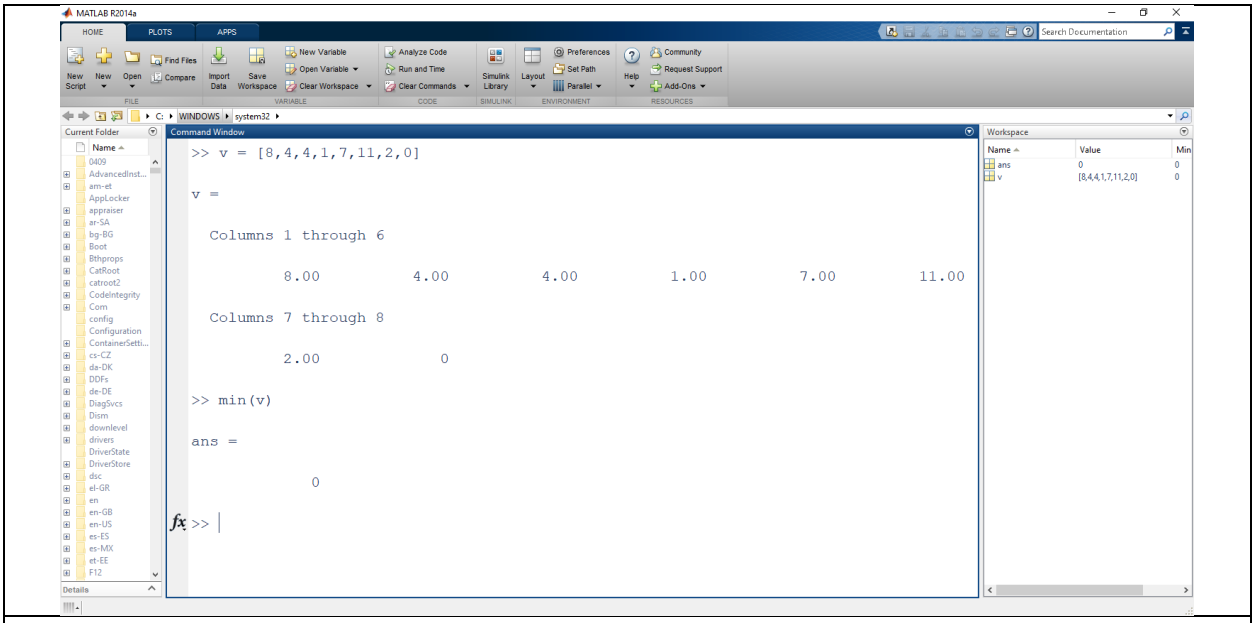


Fig 6. Find the minimum value from a vector v

To **find** the **summation** and the **production** values of the vector **x**, we use the command/function **sum(.)** and **prod(.)**

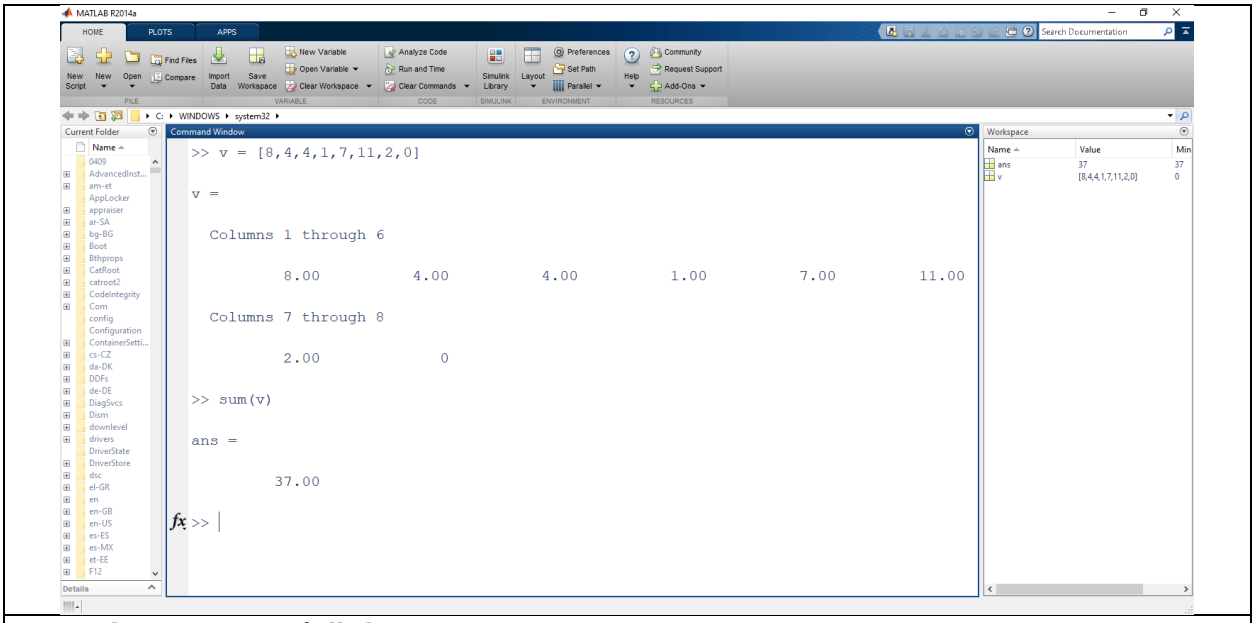


Fig 7. The summation of all element in a vector v

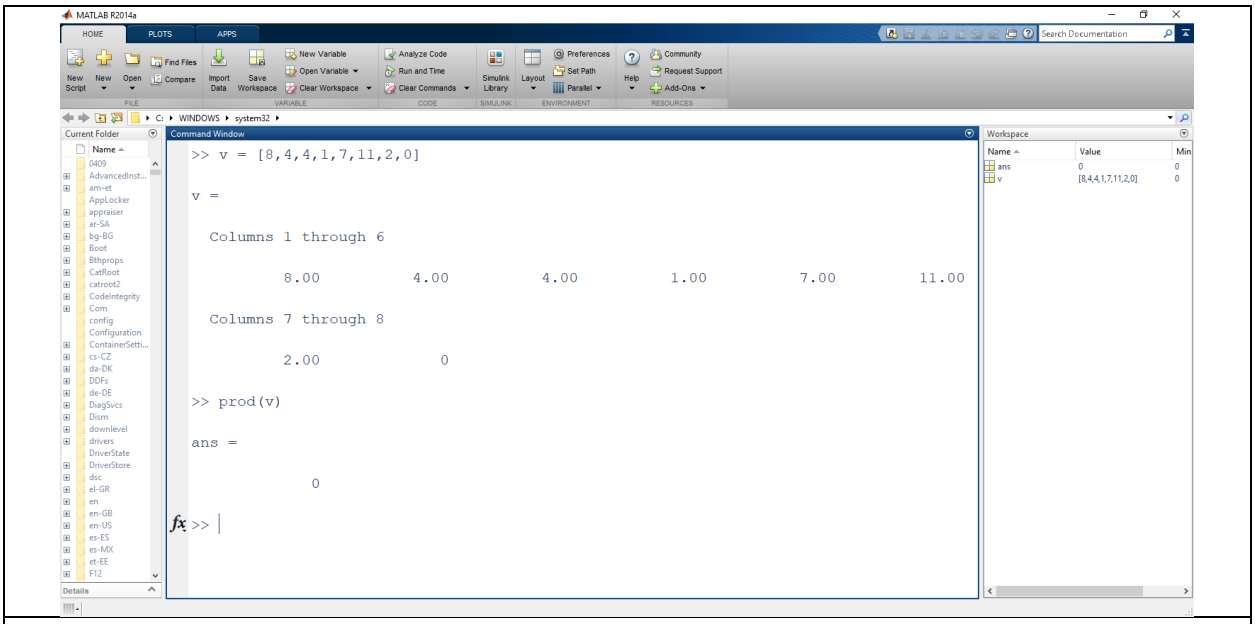


Fig 8. The production of all element in a vector v

The **mean** of a vector, also **known** as the **average equals** the **sum** of the **vector elements divided** by the **number** of **elements** in the **vector**, we use the command/function **mean(.)**

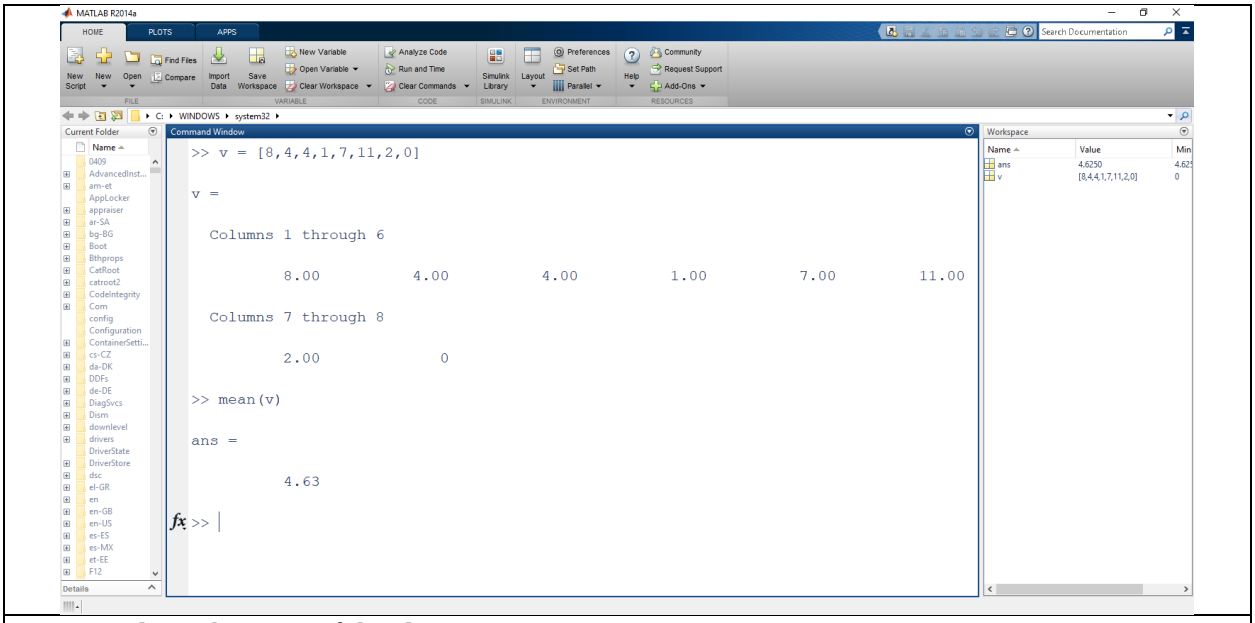


Fig 9. Evaluate the mean of the element in a vector v

To create a vector contain only number "1" or "0", we use the command/function **ones(r,c)** and **zeros(r,c)** ; where **r** and **c** are represent the **row** and **column** respectively.

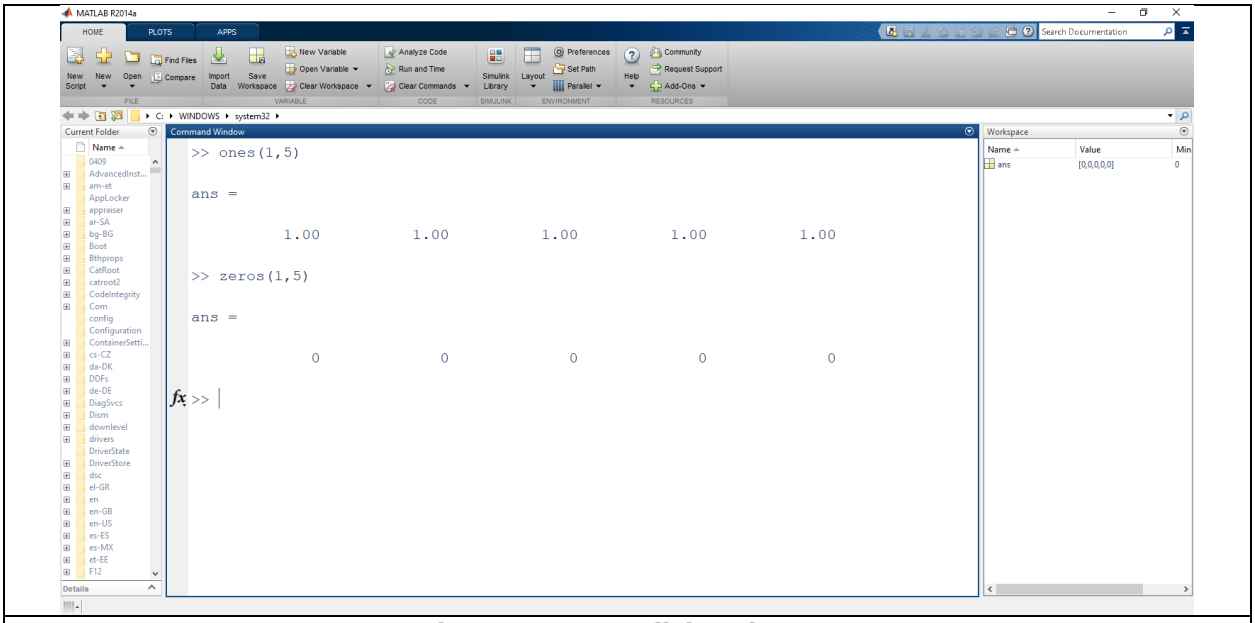


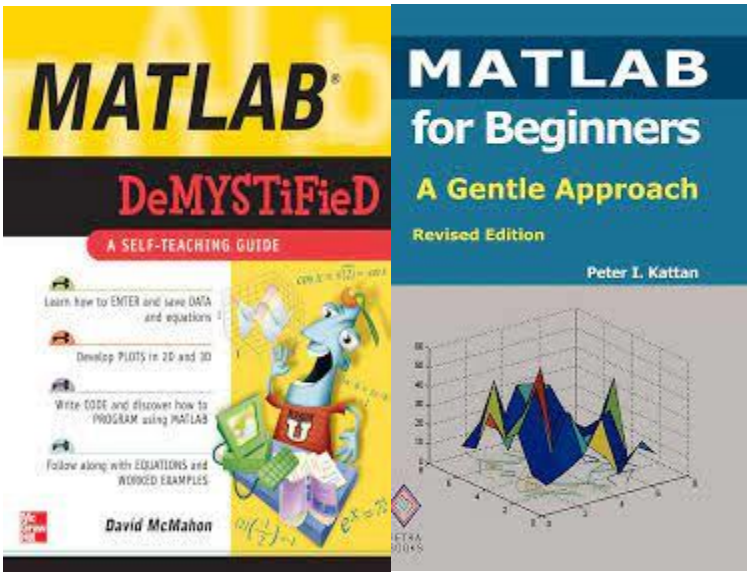
Fig 10. Create a vector contain number "1" or "0" in all the column or row

List of References

MATLAB A Practical Introduction to Programming and Problem Solving

MATLAB A Self-Teaching Guide

MATLAB for Beginners


MATLAB
DeMYSTiFieD
A SELF-TEACHING GUIDE
Learn how to ENTER and save DATA and equations
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Write CODE and discover how to PROGRAM using MATLAB
Follow along with EQUATIONS and WORKED EXAMPLES
David McMahon
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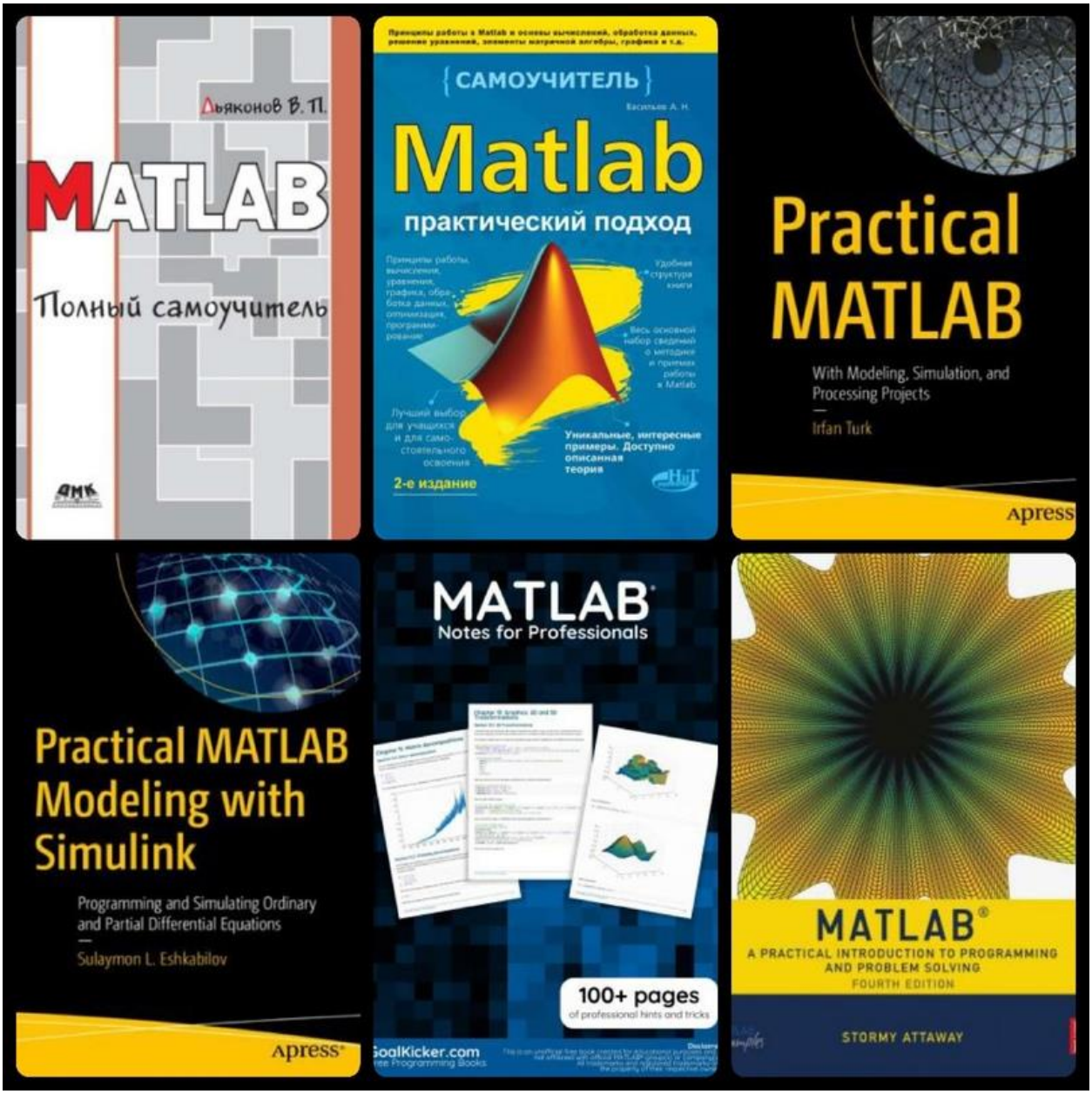
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