Importing and Exporting Data from MATLAB and Simulink to Excel

INTRODUCTION

It is important to be able to import and export data to and from Excel in order to compare analytical and experimental results. This tutorial will address this issue and discuss methods to do this using Simulink and the MATLAB command window.

EXPORTING DATA TO EXCEL

To illustrate how this is done, the following example will be used. Create a simple Simulink Model with Sine Wave, Scope, and To Workspace blocks as in Fig. 1.
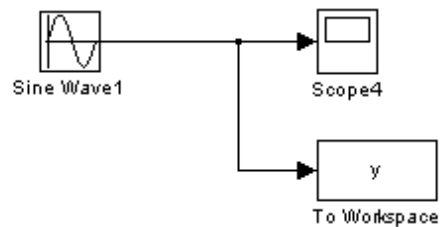

Fig. 1. Simple sine wave model

Open the ***To Workspace*** block, and in the ***Variable Name*** field, type in "y" (no quotes). This will be the name of the output variable. Now select ***Array*** from the pull down menu. Leave the default values for the remaining fields.

The To Workspace block will allow for the transfer data from the Simulink model to the MATLAB workspace, where further manipulation of the data for export to Excel can be performed. When the simulation for the model above is run, MATLAB will create an output array assigned to the variable y, and a time array assigned to the default variable tout. Create a matrix combining these two arrays, with tout as the first column and y as the second column. Once this has been done, one simple command will create an Excel file.

After running the simulation, go to the MATLAB workspace. At the command prompt type in the following commands:

```
>>A = [tout, y];
>>save filename.xls A –ascii
```

A file named filename.xls will be written in the current working directory. Open Excel and choose ***File → Open***, go to the working directory and select ***filename.xls → Open***, and a window will appear as shown in Fig. 2.

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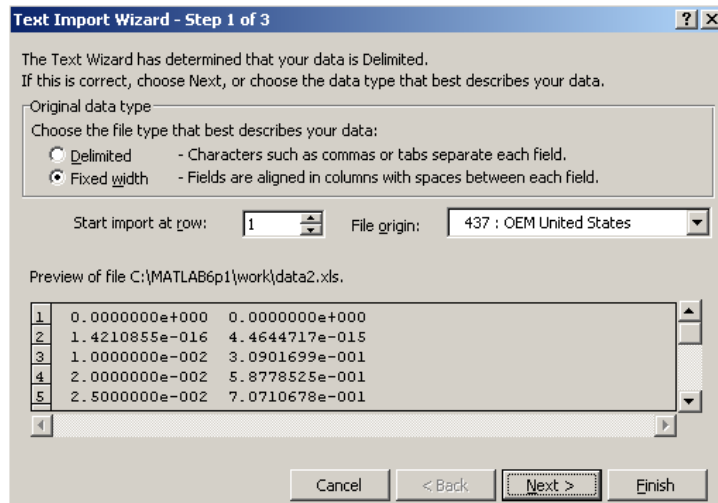   MATLAB and Simulink to Excel   1

Fig. 2. Specification of fixed width for MATLAB data import.

Choose *Fixed width* → *Next*, and a new window will appear as in Fig. 3.
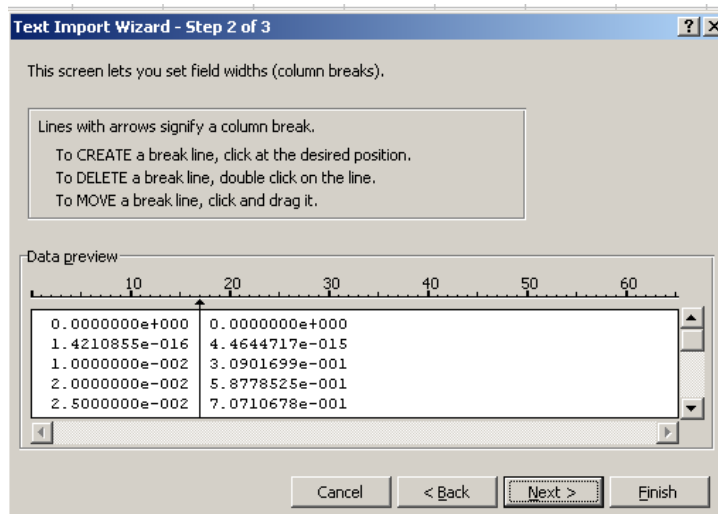

Fig. 3. Specification of column break for MATLAB data import.

Follow the instructions in the window to set the column break, and select *Next* → *Finish*. The data will be brought into Excel in two columns. The first column will be the time vector and the second column will be the values of y.

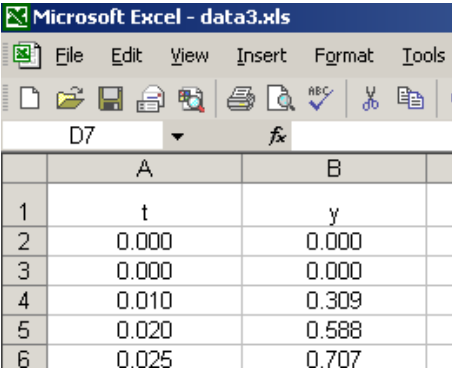## IMPORTING DATA FROM EXCEL: METHOD ONE

Importing data into MATLAB from Excel can be done in two ways. For the first method, first make sure the Excel file that will be imported is in the current working directory. Then type the following command at the prompt,

```
>>M = xlsread('filename')
```

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MATLAB will read in the Excel data and assign it to the variable name of choice (i.e. M in the example above). For this command to work properly, it is important that there be no text data in the Excel file, only columns of numbers, and that the data be left and top justified. MATLAB will import all of this data as a block and create a matrix which it will assign to the variable name specified. Assigning individual columns as separate variables will have to be done separately.

IMPORTING DATA FROM EXCEL: METHOD TWO

The second method of importing data uses the Import Wizard. The main advantage is that it allows the assignment of each data column as a variable, thus eliminating the need to later reassign the columns as in the previous method. The format of the Excel data is important. The variable names must be on the first row. There can be no additional rows above or columns to the left of the data. Fig. 4 shows the correct format

Fig. 4. The correct Excel data format.

Here, the data in columns one and two are assigned to the variables t and y respectively. If you have not done so already, go to the MATLAB command window and select *View*, then check *Current Directory*. This will open the current directory window. Then double-click on the filename.xls that was just created; the Import Wizard will launch and a window similar to Fig. 5 will appear.
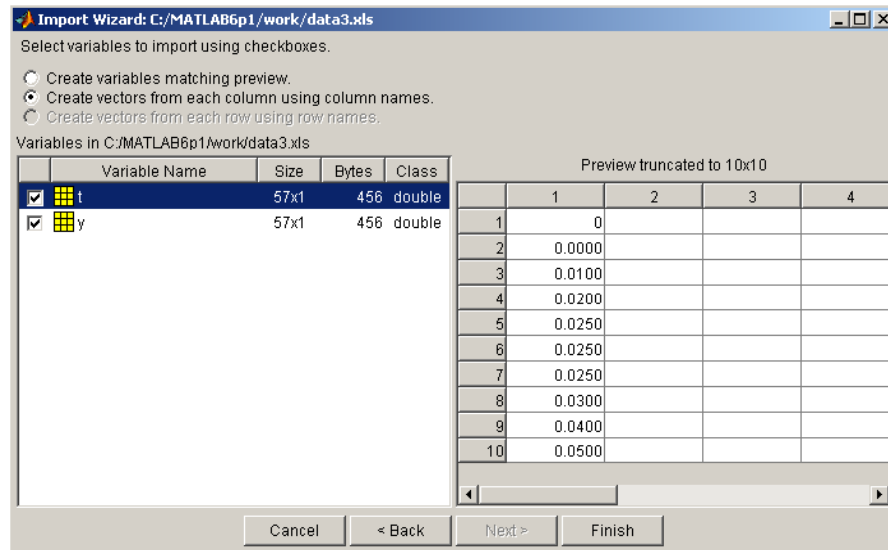
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Fig. 5. Creation of variables with the Import Wizard.

In this window, select ***Create vectors from each column using column names***. Make sure the desired variables are checked, as shown in Fig. 5, then click ***Finish***. The following message should appear in the command window:

```
>>Import Wizard created variables in the current workspace.
```

If "whos" is typed, the assigned variables in Excel are now in the MATLAB workspace, as shown in Fig. 6.
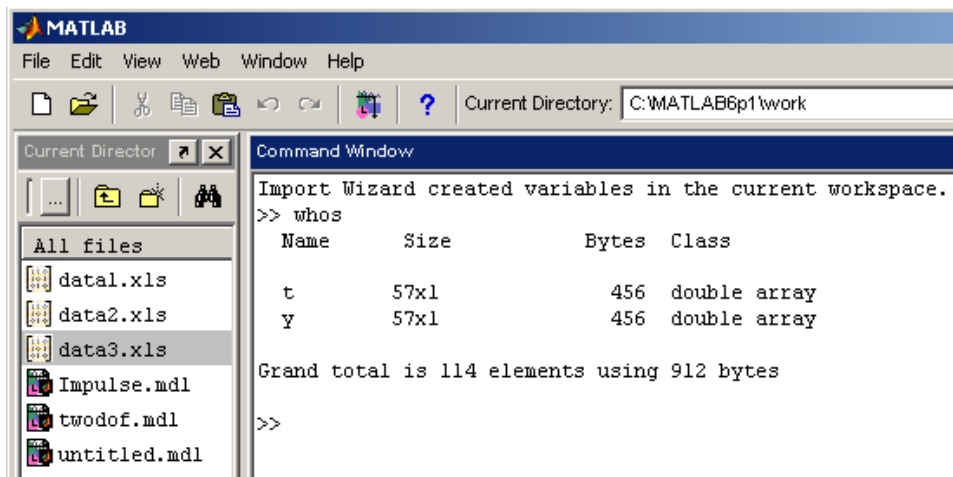

Fig. 6. MATLAB command window with newly imported Excel data.

At this point, the data can be used from the workspace or imported back into Simulink using the From Workspace block.