

# Debugging MATLAB Code

Use the information below to debug your MATLAB code. Note the following:

- The same MATLAB error can have **multiple meanings**.
- You should always treat the error MATLAB gives as a **symptom of a problem** with your code and not an exact diagnosis.
- If ever MATLAB gives you the *line number* the error is on, you should start your debugging process **at or around this line**. The error may not be on this line but should be in the general vicinity.

Arithmetic	Possible Problems with Code
<pre>&gt;&gt;b=5; &gt;&gt;a=10; &gt;&gt;b(3 + a) Undefined function or method 'b' for input arguments of type 'double'</pre>	<p>You have forgotten a mathematical operation between b and the parenthesis.  <b>Example: Did you mean <math>b*(3+a)</math> or <math>b/(3+a)</math>?</b></p>
<pre>Error using ==&gt; minus Matrix dimensions must agree</pre>	<p>You are attempting to subtract matrices of different sizes (dimensions). Use the “size” command to help you understand what needs to be modified (note: similar error for addition).</p>
<pre>Error using ==&gt; times Matrix dimensions must agree</pre>	<p>You are attempting to perform element-wise multiplication on matrices that do not have the same number of elements. Use the “size” command to help you understand which matrix needs to be modified.</p>
<pre>Error using ==&gt; mtimes Inner matrix dimensions must agree</pre>	<p>You are attempting to perform matrix multiplication where number of <i>columns</i> of the first matrix is not equal to the number of <i>rows</i> of the second matrix. Either modify the matrices to account for this OR assess whether you are really trying to do an element-wise operation instead.</p>
<pre>Error using ==&gt; mpower Inputs must be a scalar and a square matrix.</pre>	<p>You are attempting to use the “power” operation on a non-square matrix. Either modify your matrix to be a square matrix, OR if you are just interested in performing an element-wise power operation, then use the dot operator along with the power operator (Use <math>.^</math> instead of <math>^</math>.)</p>
Indexing	Possible Problems with Code
If not using a loop	
<pre>Index exceeds matrix dimensions</pre>	<p>You are attempting to access part of a matrix using a negative number (index) or a number (index) greater than the maximum number of elements in that matrix.</p>
<pre>Subscript indices must either be real positive integers or Logicals</pre>	<p>You are attempting to access part of a matrix using a complex number, non-integer, or zero.</p>
If using a loop	
<pre>Index out of bounds because numel(A)=...</pre>	<p>You are attempting to access part of a matrix using a number greater than the maximum number of elements in that matrix.</p>
<pre>Index must be a positive integer or logical</pre>	<p>You are attempting to access part of a matrix using a negative number, complex number, non-integer, or zero.</p>
General	
<pre>A(:,2) Error: Unexpected MATLAB operator</pre>	<p>You are attempting to access certain parts of a matrix using non-standard MATLAB syntax. If you are trying to access all the rows and column 2 of matrix A, then use <math>A(:,2)</math> or <math>A(1:end,2)</math> instead of <math>A(: ,2)</math>.</p>

Assignment	Possible Problems with Code
Subscripted assignment dimension mismatch	<p>You are attempting to replace a certain portion of an existing variable with a matrix that is not of the same dimension.</p> <p>The following examples will result in an error for <math>A = [1,2,3;4,5,6;7,8,9]</math></p> <p><math>A(2,:) = [3,5];</math> LHS Dim = 1x3, RHS Dim = 1x2</p> <p><math>A(1:2,1:2) = [1 \ 2 \ 3 \ 4];</math> LHS Dim = 2x2, RHS Dim = 1x4</p> <p><b>Exception:</b> <math>A(2,:) = [1;2;3]</math> will not give an error. Instead, MATLAB will automatically transpose the matrix on the RHS and replace the appropriate values in A.</p>
The expression to the left of the equals sign is not a valid target for an assignment	<p>You are attempting to assign an invalid or non-existent value to your variable OR your variable is invalid.</p> <p>The following examples will result in an error:</p> <p><math>10 = i;</math> The variable should always be on the LHS of the '=' sign.</p> <p><math>i = x;</math> results in error if x does not exist/is not defined.</p>
Parenthesis	Possible Problems with Code
Expression or statement is incorrect--possibly unbalanced ( , { , or [	You are missing parenthesis/brackets or you have too many of them.
Unbalanced or unexpected parenthesis or bracket	You are using the incorrect ( , { or [ for what you are trying to achieve. Try swapping the brackets or parenthesis until you do not get any errors.
Strings	Possible Problems with Code
A MATLAB string constant is not terminated properly	<p>You have forgotten the closing, ' when assigning a string to a variable or function. As you are assigning a string to a variable, it will remain red until you insert the closing '. It will turn purple upon correctly completing the assignment.</p> <p>The following will result in this error: <math>A = 'x';</math> instead type: <math>A = 'x'</math></p>
Undefined function or variable 'x'	<p>If you intended to assign a string to a variable, then you forgot to insert the beginning ' .</p> <p>The following will result in this error: <math>A = x';</math> instead type: <math>A = 'x'</math></p>
??? Error using ==> eq Matrix dimensions must agree	<p>You are attempting to compare two strings that are of different dimensions. Use the strcmp function to compare strings of different dimensions.</p> <p>The following will result in this error: <math>'AA' == 'AaA'</math> So, instead use <math>strcmp('AA','AaA')</math> .</p>
Function Calls	Possible Problems with Code
MATLAB in-built functions	
Undefined function or method 'eigen' for input arguments of type 'double'	You are not using the correct name of the function. It should be eig, not eigen. If you are unsure of the correct name of a function, use the MATLAB help features to search for the function name.
User-defined function	
Undefined function or method 'X' for input arguments of type 'double'	You are not using the correct name of the function or the function file is not in the current directory or the function file does not have the same name as the name in the function declaration/header line.
Output argument "Out1" (and maybe others) not assigned during call to "MyFunction"	The function "MyFunction" you have called is defined to return an output argument but that output argument does not exist in the function when it tries to return.
General	
Input argument "name of argument(s)" is undefined	You have not defined the input(s) to the function being called OR you are trying to run a function file directly by pressing the green play button within this file. This does not work. The only two ways you can call a function is by defining its input(s) first and then 1) calling it from the workspace OR 2) calling it from another script/m-file.

Not enough input arguments	The function you are trying to use expects more inputs. Use the MATLAB help features to search for information.
Too many input arguments	The function you are trying to use expects fewer inputs. Use the MATLAB help features to search for information.
Too many output arguments	You have asked the function to output more variables than have been declared in the function declaration/header line.
Plotting	Possible Problems with Code
Error using ==> plot Vectors must be the same lengths	The dependent and independent variable vectors need to have the same dimensions. Use the <code>size</code> function to check for the dimensions.
Data Files and Importing/Exporting	Possible Problems with Code
Unable to read file F3B_MShoot_condsconv.dat: No such file or directory	You are not using the correct name of the file OR you entered the wrong file extension for the file you are trying to import. Check whether the file should be .dat, .mat, etc.  OR the file does not exist in the current directory and this directory is not part of the MATLAB path. Move the required file into your current working directory before trying to load it or use it from within this directory.
>>load(answers.dat) Argument must contain a string	The <code>load</code> command expects a string input. So, you may either type: <code>&gt;&gt;load('answers.dat')</code> or <code>&gt;&gt; load answers.dat</code> .  If the filename is within parenthesis, you need ' '; if the filename is not within parenthesis, you do NOT need ' '.
Unknown text on line number ... of ASCII file ...	Your data file has text in it. You need to open the file, delete the text, and resave the file.
Loops	Possible Problems with Code
Error: File: filename.m Line: 3 Column: 1 At least one END is missing: the statement may begin here	You forgot to terminate your 'if' structure or 'for' or 'while' loops with an END statement. If you have multiple 'if' / 'for' or 'while' loops, ensure that each of those is terminated with an END statement. Click on the underlined part of the error to automatically go to the general vicinity in the code of the error.
i = 3; for i<5 c(i) = 5; end Unexpected MATLAB operator	In a 'for' loop, you may set the index 'i' equal to a constant or a vector but not a conditional statement (e.g. <, >, == etc.). A conditional statement is used in a 'while' loop and not a 'for' loop.
Miscellaneous	Possible Problems with Code
>>Z Undefined function or variable 'Z'	You are trying to access a variable that has not been defined (the variable 'Z')
z=5; m = Z+10; Undefined function or variable 'Z'	MATLAB is case sensitive. So, if z is defined but Z is not, then Z+10 will give this error.
Expression or statement is incomplete or incorrect	You have not completed a command. The following example will result in this error: <code>A = 1+3+ ;</code> A command cannot end with an operator.
Unexpected MATLAB expression	You are missing proper punctuation in a line of code or missing/incorrectly using a math operator in an equation or mfile name starts with a number.
Undefined function or method 'name' for input arguments of type 'char'	You have included spaces in the m-file name when saving it. Use '_' (underscore) to separate words in the file name. Example: If you would like to call your file 'check answers', save it as <code>'check_answers'</code> .