MATLAB EXERCISE 1.1 **Vector magnitude.** Using MATLAB, write a function `vectorMag()` that calculates the magnitude of a given vector. The input to the function is either a one-dimensional (1-D) vector, $\mathbf{a} = a_x\,\hat{\mathbf{x}}$, or a 2-D one, $\mathbf{a} = a_x\,\hat{\mathbf{x}} + a_y\,\hat{\mathbf{y}}$, or a 3-D vector,

$$\mathbf{a} = a_x\,\hat{\mathbf{x}} + a_y\,\hat{\mathbf{y}} + a_z\,\hat{\mathbf{z}} \quad \text{(Cartesian vector components)} \tag{S1.1}$$

– in a Cartesian coordinate system (Fig.S1.1), and it is specified as either a row or column array, named `vector`, with the elements of the array representing respective Cartesian components of the vector $\mathbf{a}$. *(vectorMag.m on IR)*[1]

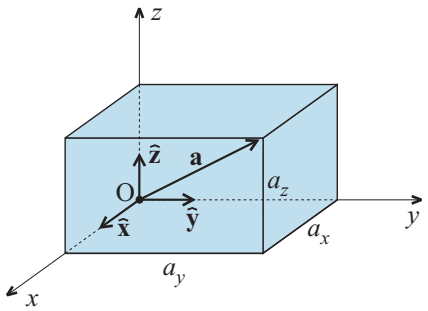

Figure S1.1 Decomposition of a vector ($\mathbf{a}$) onto components (a_x, a_y, and a_z) in a Cartesian coordinate system, Eq.(S1.1); for MATLAB Exercise 1.1.

SOLUTION:

[1] *IR* = Instructor Resources (for the book).

```
%
%   Book: MATLAB-Based Electromagnetics (Pearson Prentice Hall)
%   Author: Branislav M. Notaros
%   Instructor Resources
%   (c) 2011
%
%   This MATLAB code or any part of it may be used only for
%   educational purposes associated with the book
%
%
%

% Vector magnitude

% Function that calculates magnitude of the given vector
% (row or coulumn vector).
function mag = vectorMag(vector)
[m,n]= size(vector);
if (m~=1)&&(n~=1)
    mag = 0;
    disp('Error - vector of improper dimensions');
else
mag = sqrt(sum(vector.^2));
end;
```