MATLAB EXERCISE 1.36 **Main MoM matrix, for arbitrary charged body.** Write a function `matrixA()` that computes the matrix $[A]$ in Eq.(1.58) (from the book) for the method-of-moments analysis of an arbitrary charged metallic body – based on Eq.(1.61). The function is independent of the geometry of the body; rather, it takes as input the previously calculated arrays of surfaces of small patches ΔS_i, $i = 1, 2, \ldots, N$, and coordinates of their centers [see Fig.1.22 (from the book), for example]. However, the program distinguishes between the following three cases: (i) charged strips (centers along a straight line), (ii) charged plates (centers in one plane), and (iii) charged 3-D objects (centers in 3-D space). This function can then be used in MoM codes for different geometries, as long as the approximation in Eq.(1.61) is used. *(matrixA.m on IR)*

SOLUTION:

```
%
%   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
%
%
%


%    Main MoM matrix, for arbitrary charged body


function A = matrixA (EPS,dS,x,y,z)
N = length(x);
if (length(dS)== N)
    for i = 1 : N
        for j = 1 : N
            if nargin == 3
                r = sqrt ((x(j)-x(i))^2);
            end;
            if nargin == 4
                r = sqrt ((x(j)-x(i))^2 + (y(j)-y(i))^2);
            end;
            if nargin == 5
                r = sqrt ((x(j)-x(i))^2 + (y(j)-y(i))^2 + (z(j)-z(i))^2);
            end;
            if (i==j)
                A(i,j) = sqrt(dS(j))/(2*sqrt(pi)*EPS);
            else
                A(i,j) = dS(j)/(4*pi*EPS*r);
            end;
        end;
    end;
else
    A = 0;
    disp ('Incorrect input data in function matrixA');
end;
```