MATLAB EXERCISE 2.18 **Main MoM matrix for a parallel-plate capacitor.** Consider the parallel-plate capacitor shown in Fig.S2.9, and write a function `matrixACap()` in MATLAB that computes the matrix $[A]$ in Eq.(1.58) (from the book) for the method-of-moments analysis of the structure, assuming that the upper and lower plates are at potentials V and $-V$, respectively. *(matrixACap.m on IR)*

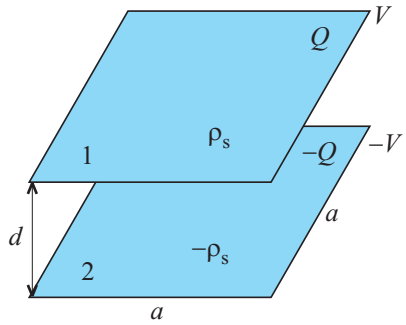

Figure S2.9 Air-filled parallel-plate capacitor with square plates; for MATLAB Exercise 2.18.

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 a parallel-plate capacitor


function A = matrixACap (EPS,dS,x,y,d)
N = length(x);

if (length(dS)== N)
    for i = 1 : N
        for j = 1 : N
            r1 = sqrt ((x(j)-x(i))^2 + (y(j)-y(i))^2 );
            r2 = sqrt ((x(j)-x(i))^2 + (y(j)-y(i))^2 + d^2);
            if (i==j)
                A(i,j) = sqrt(dS(j))/(2*sqrt(pi)*EPS)- dS(j)/(4*pi*EPS*r2);
            else
                A(i,j) = dS(j)/(4*pi*EPS*r1) - dS(j)/(4*pi*EPS*r2);
            end;
        end;
    end;
else
    A = 0;
    disp ('Incorrect input data in function matrixACap');
end;
```