

MATLAB EXERCISE 1.18 **Numerical integration of a line integral.** Write a function `LineIntegral()` in MATLAB for numerical integration of the line integral of a vector \mathbf{a} along a given path between points A and B in space. The integral is (approximately) calculated as

$$\int_A^B \mathbf{a} \cdot d\mathbf{l} \approx \sum_{i=1}^N \mathbf{a}_i \cdot d\mathbf{l}_i, \quad (\text{S1.8})$$

where \mathbf{a}_i and $d\mathbf{l}_i$ are given (approximate) values of \mathbf{a} and $d\mathbf{l}$ at N points along the path (the input to the program are \mathbf{a}_i and $d\mathbf{l}_i$, $i = 1, 2, \dots, N$). (*LineIntegral.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  
%  
%  
%
```

```
% Numerical integration of a line integral
```

```
function [result] = LineIntegral(A,B)  
if(size(A)==size(B))  
    result = sum(sum(A.* B,2),1);  
else disp ('Error - vector dimensions are not valid');  
    result = 0;  
end;
```