Table of Contents

LakeOntarioVolume

This script calculates the volume of Lake Ontario using Simpson's rule and for loops

```
% end section
```

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```
% end section
```

Initialization

```
% In this section you should input or load any information that you
 will
% need before your problem-solving commands.
load("lakeOntario");
depth = 5000;
Dy = 4800; % for first volume
Dz = 60; %  for second volume
% end section
```

First Part

```
% initialize array with all values as 0
A = ones(1, 25);
A = 0*A;

% loop through the array B hitting each row with each index and then
 adding
% value of the Simpson's sum at each row in B to the array
for idx1 = 1:1:25
        f = B(idx1,:);
        coeff = 2*ones(1, length(f));
        coeff(1) = 1;
        coeff(end) = 1;
```

```
            coeff(2:2:length(coeff)) = 4;
            format short;
            simp = sum(coeff.*f)*Dy;
            A(idx1) = simp;
    end

    % finding the volume of lake using Simpson's method
    coeff1 = 2*ones(1, length(A));
    coeff1(1) = 1;
    coeff1(end) = 1;
    coeff1(2:2:length(coeff1)) = 4;
    format short;
    volume = abs(sum(coeff1.*A)*depth);

    % end section
```

Second Part

Using cross-sectional area of North-South slice of lake

```
    % initialize array with all values as 0
    C = ones(1, 25);
    C = 0*C;

    % loop through the array B hitting each row with each index and then
     adding
    % value of the Simpson's sum at each row in B to the array
    for idx1 = 1:1:25
            f2 = B(:,idx1);
            coeff = 2*ones(1, length(f2));
            coeff(1) = 1;
            coeff(end) = 1;
            coeff(2:2:length(coeff)) = 4;
            format short;
            simp = sum(coeff.*transpose(f2))*Dz;
            C(idx1) = simp;
    end

    % finding the volume of lake using Simpson's method
    coeff2 = 2*ones(1, length(C));
    coeff2(1) = 1;
    coeff2(end) = 1;
    coeff2(2:2:length(coeff2)) = 4;
    format short;
    volume2 = abs(sum(coeff2.*C)*depth);

    % end section
```

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