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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 (from 0 to 300000)

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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