**Experiment No: 16**

**Name of the Experiment:** Study of Simpson’s 3/8 Integral Method to Calculate Integral Value of a Function with Limit.

**Objectives:** The objective of this experiment is to use Simpson’s 3/8 Integral Method to calculate integral value of any limited function, using MATLAB.

**Theory:** If the interval [a,b] is split up into n subintervals, and n is an even number, the composite Simpson's rule is calculated with the following formula:

**∫ab f(x) dx = 3h/8[(y0+yn)+3(y1+y2+y4+y5+….+yn-1)+2(y3+y6+y9+…..+yn-3)]**

Where **xj = a+jh**

**Tool:** MATLAB Software

**Methodology:**

**MATLAB Code:**

%Function declaration

f= @(x) 3\*x^2+3;

a=0;b=6;

n=b-a;

%height

h = (b - a) / n;

%simpson's formula

sum\_x1 = 0;sum\_x2=0;

for i=0:1:n

x = a + i \* h;

if(i>1 && i<n && mod(i,3)==0)

sum\_x2=sum\_x2+f(x);

end

if (i>0 && i<n && mod(i,3)~=0)

sum\_x1 = sum\_x1 + f(x);

end

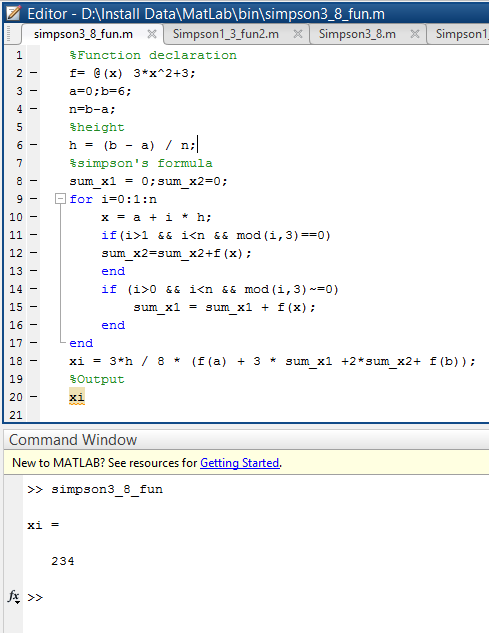
end

xi = 3\*h / 8 \* (f(a) + 3 \* sum\_x1 +2\*sum\_x2+ f(b));

%Output

xi

**Output:**

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**Result(s)& Discussion:** The integration value is 234.

**Conclusion:** We have found the exact integral value of function **3x2 +3** from limit 0 to 6 which is same as the calculated value (∫**60 3x2 +3 dx**).

**References:**

[1]C. Chapra and P. Canale Raymond , “*Numerical Methods for Engineers”,* 7th ed. McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121, 2015