

**Universidad Don Bosco**



**CICLO 01 – 2021**

**Aplicación de metodos numericos**

**Examen teorico 2**

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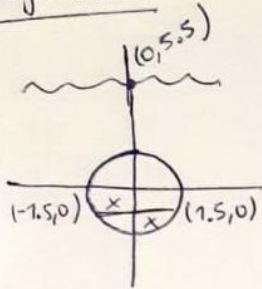
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**CH161904**

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#### Ejercicio 4.

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$$F = \int_a^b \rho L(y) h(y) dy$$

$$L(y) = 2x$$

$$x^2 + y^2 = 2.25$$

$$x = \sqrt{2.25 - y^2}$$

$$2x = 2\sqrt{2.25 - y^2}$$

$$F = \int_{-1.5}^{1.5} 7840 (2\sqrt{2.25 - y^2}) (5.5 - y) dy$$

$$h(y) = 5.5 - y$$

Transformar la integral

$$y = \frac{1}{2} [(b-a)t + a + b] \quad dy = \left(\frac{b-a}{2}\right) dt$$

$$y = \frac{1}{2} [(1.5+1.5)t + 1.5 + 1.5] \quad dy = \frac{1.5+1.5}{2} dt$$

$$y = \frac{1}{2} (3t) \rightarrow y = 1.5t \quad dy = 1.5 dt$$

$$F = \int_{-1}^1 15680 \sqrt{2.25 - (1.5t)^2} (5.5 - (1.5t)) 1.5 dt$$

Exacto y aproximado

$$\gg \text{syms } y; p = [1 \ 0 \ -36/17 \ 0 \ 126/85 \ 0 \ -84/221 \ 0 \ 63/2431 \ 0];$$

$$\gg m = 0$$

$$- 0.968160239507628$$

$$- 0.836031107326633$$

$$- 0.6133371432700591$$

$$- 0.324253423403809$$

$$0.968160239507626$$

$$0.836031107326635$$

$$0.6133371432700591$$

$$0.324253423403809$$

$$\gg C1 = \text{double} (\text{int} ((y-m(2)) * (y-m(3)) * (y-m(4)) * (y-m(5)) * (y-m(6)) * (y-m(7)) * (y-m(8)) / ((m(1)-m(2)) * (m(1)-m(3)) * (m(1)-m(4)) * (m(1)-m(5)) * (m(1)-m(6)) * (m(1)-m(7)) * (m(1)-m(8))), x, -1, 1))$$

$c_1 = 0.330239355001257$

```
>> c2=double(int(((y-m(1))*(y-m(3))*(y-m(4))*(y-m(5))*(y-m(6))*(y-m(7))*(y-m(8))*(y-m(9)))/((m(2)-m(1))*(m(2)-m(3))*(m(2)-m(4))*(m(2)-m(5))*(m(2)-m(6))*(m(2)-m(7))*(m(2)-m(8))*(m(2)-m(9)))),y,-1,1))
```

**c2 =**

**0.081274388361573**

```
>> c3=double(int(((y-m(1))*(y-m(2))*(y-m(4))*(y-m(5))*(y-m(6))*(y-m(7))*(y-m(8))*(y-m(9)))/((m(3)-m(1))*(m(3)-m(2))*(m(3)-m(4))*(m(3)-m(5))*(m(3)-m(6))*(m(3)-m(7))*(m(3)-m(8))*(m(3)-m(9)))),y,-1,1))
```

**c3 =**

**0.180648160694863**

```
>> c4=double(int(((y-m(1))*(y-m(2))*(y-m(3))*(y-m(5))*(y-m(6))*(y-m(7))*(y-m(8))*(y-m(9)))/((m(4)-m(1))*(m(4)-m(2))*(m(4)-m(3))*(m(4)-m(5))*(m(4)-m(6))*(m(4)-m(7))*(m(4)-m(8))*(m(4)-m(9)))),y,-1,1))
```

**c4 =**

**0.260610696402929**

```
>> c5=double(int(((y-m(1))*(y-m(2))*(y-m(3))*(y-m(4))*(y-m(6))*(y-m(7))*(y-m(8))*(y-m(9)))/((m(5)-m(1))*(m(5)-m(2))*(m(5)-m(3))*(m(5)-m(4))*(m(5)-m(6))*(m(5)-m(7))*(m(5)-m(8))*(m(5)-m(9)))),y,-1,1))
```

**c5 =**

**0.312347077040008**

```
>> c6=double(int(((y-m(1))*(y-m(2))*(y-m(3))*(y-m(4))*(y-m(5))*(y-m(7))*(y-m(8))*(y-m(9)))/((m(6)-m(1))*(m(6)-m(2))*(m(6)-m(3))*(m(6)-m(4))*(m(6)-m(5))*(m(6)-m(7))*(m(6)-m(8))*(m(6)-m(9)))),y,-1,1))
```

**c6 =**

**0.081274388361575**

```
>> c7=double(int(((y-m(1))*(y-m(2))*(y-m(3))*(y-m(4))*(y-m(5))*(y-m(6))*(y-m(8))*(y-m(9)))/((m(7)-m(1))*(m(7)-m(2))*(m(7)-m(3))*(m(7)-m(4))*(m(7)-m(5))*(m(7)-m(6))*(m(7)-m(8))*(m(7)-m(9)))),y,-1,1))
```

**c7 =**

**0.180648160694857**

```
>> c8=double(int(((y-m(1))*(y-m(2))*(y-m(3))*(y-m(4))*(y-m(5))*(y-m(6))*(y-m(7))*(y-m(9)))/((m(8)-m(1))*(m(8)-m(2))*(m(8)-m(3))*(m(8)-m(4))*(m(8)-m(5))*(m(8)-m(6))*(m(8)-m(7))*(m(8)-m(9)))),y,-1,1))
```

**c8 =**

**0.260610696402933**

```
>> c9=double(int(((y-m(1))*(y-m(2))*(y-m(3))*(y-m(4))*(y-m(5))*(y-m(6))*(y-m(7))*(y-m(8)))/((m(9)-m(1))*(m(9)-m(2))*(m(9)-m(3))*(m(9)-m(4))*(m(9)-m(5))*(m(9)-m(6))*(m(9)-m(7))*(m(9)-m(8)))),y,-1,1))
```

**c9 =**

**0.312347077040006**

```

>> int-exacta = double(int(15680*((2.25-y^2)^(1/2)*(5.5-y), y, -1.5, 1.5))
H||>> int-exacta = 3.047973192512817e+05
>> error = abs(int-exacta - Aproximado)
H||>> error = 1.883733032937162e+02

```