UNIVERSIDADE ESTADUAL DO NORTE DO PARANÁ
CAMPUS LUIZ MENEGHEL – BANDEIRANTES – PR
Centro de Ciências Tecnológicas – CCT
Ciência da Computação – Calculo II – 2021
Aluno: Gabriel Rizzi da Silva
RA: 202011113030001

Cálculo II

Calcule as integrais:

a)\($\int_0^1 6t^2\vec{i} + t\vec{j} - 8t^3\vec{k}$ \)

$$\int_0^1 (6t^2i + tj - 8t^3k)dt = \left[\int_0^1 6t^2 dt\right]i + \left[\int_0^1 t\,dt\right]j - \left[\int_0^1 8t^3 dt\right]k$$

$$\int_0^1 (6t^2i + tj - 8t^3k)dt = [2t^3]_0^1 i + \left[\frac{t^2}{2}\right]_0^1 j - [2t^4]_0^1 k$$

$$\int_0^1 (6t^2i + tj - 8t^3k)dt = [2(1)^3 - 0]i + \left[\frac{1^2}{2} - 0\right]j - [2(1)^4 - 0]k$$

$$\int_0^1 (6t^2i + tj - 8t^3k)dt = 2i + \frac{1}{2}j - 2k$$

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b) \\($\int_0^1 \left(\frac{1}{t+1}\vec{i} + \frac{1}{t^2+1}\vec{j} + \frac{2t}{t^2+1}\vec{k} \right)$ \\)

$$\int_0^1 \left(\frac{1}{t+1}i + \frac{1}{t^2+1}j + \frac{2t}{t^2+1}k \right) dt = \left[\int_0^1 \frac{1}{t+1}dt \right]i + \left[\int_0^1 \frac{1}{t^2+1}dt \right]j + \left[\int_0^1 \frac{2t}{t^2+1}dt \right]k$$

$$\int_0^1 \frac{1}{t+1}dt = [\ln(t+1)]_0^1 = \ln(2) - \ln(1) = \ln(2)$$

$$\int_0^1 \frac{1}{t^2+1}dt = [\mathrm{arctg}(x)]_0^1 = \mathrm{arctg}(1) - \mathrm{arctg}(0) = \frac{\pi}{4} - 0 = \frac{\pi}{4}$$

Se t = 0, u = 1;

se t = 1, u = 2

$$\int_0^1 \frac{2t}{t^2+1}dt = \int_1^2 \frac{du}{u} = [\ln(u)]_1^2 = \ln(2) - \ln(1) = \ln(2)$$

$$\int_0^1 \left(\frac{1}{t+1}i + \frac{1}{t^2+1}j + \frac{2t}{t^2+1}k \right) dt = \ln(2)\,i + \frac{\pi}{4}j + \ln(2)\,k$$