Honours Degree of Bachelor of Science in Artificial Intelligence

Batch 21 - Level 2 (Semester 2)

CM 2320 - Mathematical Methods

Tutorial 3

1. The Dirac delta function is defined by the filter property

$$\int_{-\infty}^{\infty} \delta(t-a)f(t)dt = f(a),$$

for a smooth function $f(t)$. Evaluate the following expressions.

a) $\int_{-\infty}^{\infty} \delta(2t-\pi)\cos(t)dt$

b) $\int_{-\infty}^{\infty} \delta(3t-2)t^2dt$

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2. Find the numerical values of following functions.

a) $\int_{-1}^{1} \delta(t)dt$

b) $\int_{-5}^{3} (2\delta(t)+3\delta'(t))dt$

c) $\int_{-1}^{1} e^{5t}\delta(t)dt$

d) $\int_{-1}^{1} e^{2t}\delta'(t)dt$

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3. Show that $\delta(ct) = \frac{1}{|c|}\delta(t)$.

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4. Find the Laplace transform of $\delta(t-c)$.

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