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COURSE:- Computer Science

MAT 104 ASSIGNMENT

Find the integral of the following

1) $\int \sin 7x \cos 2x \, dx$

Soln

Using $\sin a \cdot \cos b = \frac{1}{2}[\sin(a+b) + \sin(a-b)]$

where $a = 7x \quad b = 2x$

$\sin 7x \cos 2x = \frac{1}{2}[\sin(7x+2x) + \sin(7x-2x)]$

$\sin 7x \cos 2x = \frac{1}{2}[\sin(9x) + \sin(5x)]$

$\frac{1}{2}\int \sin(9x) \, dx + \frac{1}{2}\int \sin(5x) \, dx$

$\frac{1}{2}\left[\frac{-\cos 9x}{9}\right] + \frac{1}{2}\left[\frac{-\cos 5x}{5}\right]$

$\frac{-\cos 9x}{18} - \frac{\cos 5x}{5} + C$

2) $\int \cos 3x \cos x \, dx$

Soln

$\cos x \cdot \cos y = \frac{1}{2}[\cos(x+y) + \cos(x-y)]$

$\cos 3x \cos x = \frac{1}{2}[\cos(4x) + \cos(2x)]$

$\therefore \frac{1}{2}\int \cos(4x) \, dx + \frac{1}{2}\int \cos(2x) \, dx$

$\frac{1}{2}\left(\frac{\sin 4x}{4}\right) + \frac{1}{2}\frac{\sin 2x}{2}$

$\frac{\sin 4x}{8} + \frac{\sin 2x}{4} + C$

3) $\int \frac{\cos x}{\sin 2x} \, dx = \int \frac{\cos(x)}{\sin(x)} \cdot \frac{d}{\sin(x)} \, dx$

Soln $\therefore \int \cot x \cdot \frac{d}{\sin(x)} \, dx$