Stuksgewyse Integrasie

Evaluate the following integrals using integration by parts:

$\int xe^{3x}\,dx$	$\frac{xe^{3x}}{9}+\frac{e^{3x}}{9}+k$
$\int x\sin(5x)\,dx$	$-\frac{x}{5}cos5x+\frac{1}{25}sin5x+k$
$\int x^2\ln(x)\,dx$	$\frac{x^3lnx}{3}-\frac{x^3}{9}+k$
$\int x^2e^{-5x}\,dx$	$\frac{x^2e^{-5x}}{5}-\frac{2xe^{-5x}}{25}-\frac{2e^{-5x}}{125}+k$
$\int x^2\cos(3x)\,dx$	$\frac{x^2}{3}sin3x+\frac{2x}{9}cos3x-\frac{2}{27}sin3x+k$
$\int(x^2+2x+1)e^{7x}\,dx$	Solution follows after table
$\int\arctan(x)\,dx$	$xarctanx-\frac{1}{2}ln\lvert1+x^2\rvert+k$

Evaluate

$$\int (x^2 + 2x + 1)e^{7x}\,dx$$

Let

$$u = x^2 + 2x + 1$$
$$dv = e^{7x}\,dx$$

Then

$$du = (2x + 2)\,dx$$
$$v = \frac{1}{7}e^{7x}$$

Hence,

$$uv - \int v\,du = \frac{1}{7}(x^2 + 2x + 1)e^{7x} - \int \frac{1}{7}(2x + 2)e^{7x}\,dx$$

Let

$$U = 2x + 2$$
$$dV = \frac{1}{7}e^{7x}\,dx$$

Then

$$dU = 2\,dx$$
$$V = \frac{1}{49}e^{7x}$$

Hence,

$$= \frac{1}{7}(x^2 + 2x + 1)e^{7x} - [\frac{(2x + 2)e^{7x}}{49} - \int \frac{2e^{7x}}{49}\,dx]$$

$$= \frac{1}{7}(x^2 + 2x + 1)e^{7x} - \frac{1}{49}(2x + 2)e^{7x} + \frac{2}{343}e^{7x} + C$$

$$\int (x^2 + 2x + 1)e^{7x}\,dx = \frac{e^{7x}(49x^2 + 84x + 37)}{343} + C$$