

Integral of Dual Functions

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In this paper I derive the formula for integral of dual functions.

The integral of dual functions is the formula:

$$(\int f(x + \epsilon) dx) = (\int f(x) dx) + f(x)\epsilon$$

Proof:

$$\therefore (\int f(x) dx)' = f(x)$$

$$\therefore f'(x) = (f(x + \epsilon) - f(x)) / \epsilon$$

The derivative of the integral is the function
Formula for the derivative

$$\therefore (\int f(x) dx)' = ((\int f(x + \epsilon) dx) - (\int f(x) dx)) / \epsilon$$

$$\therefore f(x) = ((\int f(x + \epsilon) dx) - (\int f(x) dx)) / \epsilon$$

$$\therefore f(x)\epsilon = (\int f(x + \epsilon) dx) - (\int f(x) dx)$$

$$\therefore (\int f(x + \epsilon) dx) = (\int f(x) dx) + f(x)\epsilon$$

Inserting into formula for the derivative

Q.E.D.