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Bagaimanakah ide kalian untuk menentukan fungsi $M(u, y)$ sedemikian sehingga PD berikut merupakan PD Eksak.
 $M(u, y) du + (2u^2 y^3 + u^4 y) dy = 0$

Langkah penyelesaian:

①. Suatu persamaan diferensial biasa disebut PD Eksak jika

$$M(u, y) = \frac{\partial F}{\partial u}(u, y) \quad \text{dan} \quad N(u, y) = \frac{\partial F}{\partial y}(u, y)$$

maka dari persamaan di atas diperoleh

$$N(u, y) = 2u^2 y^3 + u^4 y$$

②. Perhatikan bahwa

$$\frac{\partial M}{\partial y}(u, y) = \frac{\partial^2 F}{\partial y \partial u}(u, y) \quad \text{dan} \quad \frac{\partial N}{\partial u}(u, y) = \frac{\partial^2 F}{\partial u \partial y}(u, y)$$

$$\Rightarrow N(u, y) = 2u^2 y^3 + u^4 y$$

$$\frac{\partial N}{\partial u}(u, y) = 4uy^3 + 4u^3 y$$

③. Suatu PD dikatakan Eksak jika memenuhi hubungan

$$\frac{\partial M}{\partial y}(u, y) = \frac{\partial N}{\partial u}(u, y)$$

$$\frac{\partial M}{\partial y}(u, y) = 4uy^3 + 4u^3 y$$

$$④. M(u, y) = \int \frac{\partial M}{\partial y}(u, y) dy$$

$$= \int (4uy^3 + 4u^3 y) dy$$
$$= uy^4 + 2u^3 y^2 + C, \quad C = 0$$

Jadi, fungsi $M(u, y) = uy^4 + 2u^3 y^2$, sedemikian sehingga

PD $(uy^4 + 2u^3 y^2) du + (2u^2 y^3 + u^4 y) dy$ merupakan PD Eksak.