Deret Taylor

25 Maret 24

$C_0 = \frac{f(a)}{0}$

$C_1 = \frac{f'(a)}{1!}$

$C_2 = \frac{f^2(a)}{2!}$

$C_3 = \frac{f^3(a)}{3!}$

$C_4 = \frac{f^4(a)}{4!}$

$C_n = \frac{f^{(n)}(a)}{n!}$

$f(x) = \sum_{n=0}^{\infty} C_n (x-a)^n$

$= \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!} (x-a)^n$

↳ Deret Taylor

khusus $a = 0$

↳ Deret McLaurin

$f(x) = \sum_{n=0}^{\infty} C_n (x-0)^n$

$= \sum_{n=0}^{\infty} \frac{f^{(n)}(0)}{n!} (x-0)^n$

↳ Deret McLaurin

$f(x) = e^x$, DT $f(x)$ sekitar $x-1$

$C_0 = f(1) = e^1 = e$

$C_1 = \frac{f'(1)}{1} = e$

$C_2 = \frac{e}{2!}$

$e^x = e + e(x-1) + \frac{e}{2!}(x-1)^2 + \frac{e}{3!}(x-1)^3 + \dots$

$e^x = \frac{x^n}{n!}$

Deret Mac Laurin

$f(x) = \sin x$

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}$$

$$C_0 = \frac{x}{1!}$$

$$C_1 = -\frac{x^3}{3!}$$

$$C_2 = \frac{x^5}{5!}$$

$$C_3 = -\frac{x^7}{7!}$$

$f(0) = \sin(0) = 0$

$f'(0) = \cos(0) = 1$

$f''(0) = -\sin(0) = 0$

$f'''(0) = -\cos(0) = -1$

$f''''(0) = \sin(0) = 0$

Diperoleh:

$$\sin(x) = 0 + x + 0 - \frac{x^3}{3!} + 0 + \frac{x^5}{5!} + 0 - \frac{x^7}{7!} + \dots$$

$$= x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!}$$