

1. Ableitung: Zeilenvektor

Curve: Funktionen

17. Februar 2017

1) Geom. was?

$$F = x^2 i + (3x + 2) j + \sin x k$$

$$\frac{dF}{dx} = 2x i + 3 j + \cos x k$$

$$\frac{d^2 F}{dx^2} = 2 i - \sin x k$$

$$\text{(c)} \quad \frac{dF}{dx} \Big|_{x=1} = 2(1) i + \cos(1) k = 2 i + k$$

$$\left| \frac{dF}{dx} \right|_{x=1} = \sqrt{2^2 + 1^2} = \sqrt{5}$$

$$\begin{aligned} |F - F| &= (x^2 i + (3x + 2) j + \sin x k) - (x^2 i + (3x + 2) j + \sin x k) \\ &= x^4 + (3x + 2)^2 + \sin^2 x \\ &= x^4 + 9x^2 + 12x + 4 + \sin^2 x \end{aligned}$$

$$\frac{d(F - F)}{dx} = 4x^3 + 18x + 12$$

$$\text{(2)} \quad r = (t^2 + 3t) i - 25 \sin 3t j + 3e^{2t} k$$

$$\text{(a)} \quad \frac{dr}{dt} = (2t + 3) i - 6 \cos 3t j + 6e^{2t} k$$

$$\text{b)} \quad \frac{d^2 r}{dt^2} = 2 i + 18 \sin 3t j + 12e^{2t} k$$

$$\text{c)} \quad \left| \frac{dr^2}{dt^2} \right|_{t=0} = 2 i + 18 \sin 3(0) j + 12e^{2(0)} k = 2 i + 32 \cdot 64 k = \sqrt{2^2 + 32 \cdot 64^2}$$

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17/ECE02/01

CIVIL ENGINEERING

① $\phi = xy^2z^3 + x^2y^2z^2$

Command window

clear

clc

Syms x, y, z

$$F = x^2 * y^2 * z^3 + x * y^2 * z^2$$

diff (F, x)

diff (F, y)

diff (F, z)

Syms (N, x, z, y, 3, 2, -2)