



Kunnskap for en bedre verden

# TMA4105 Matematikk 2 – våren 2024

## Oversiktsforelesning 3

# Nøkkelpbegreper uke 4

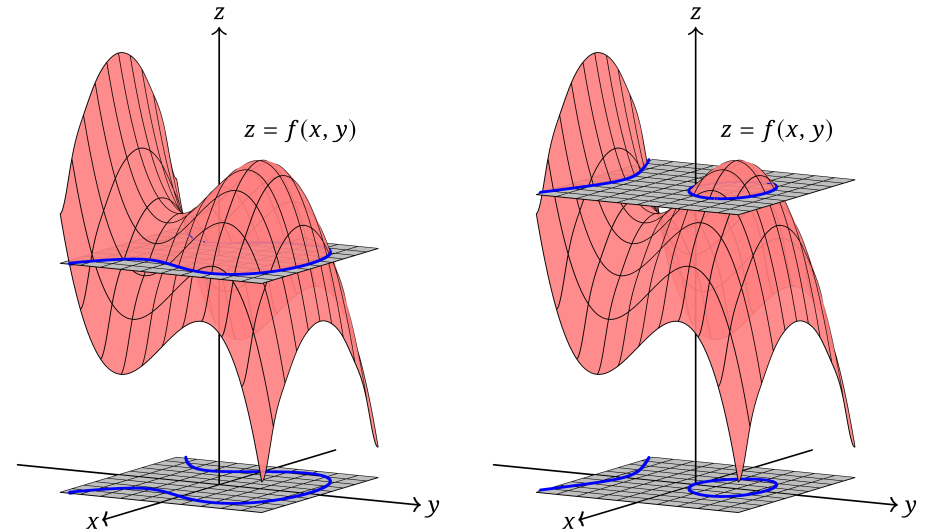
- Funksjoner av flere variable
- Nivåkurver og nivåflater
- Grenseverdi
- Kontinuitet
- Partiellderivasjon
- Kvadratiske flater

# Nivåkurver

For et gitt tall  $c$ , er kurven

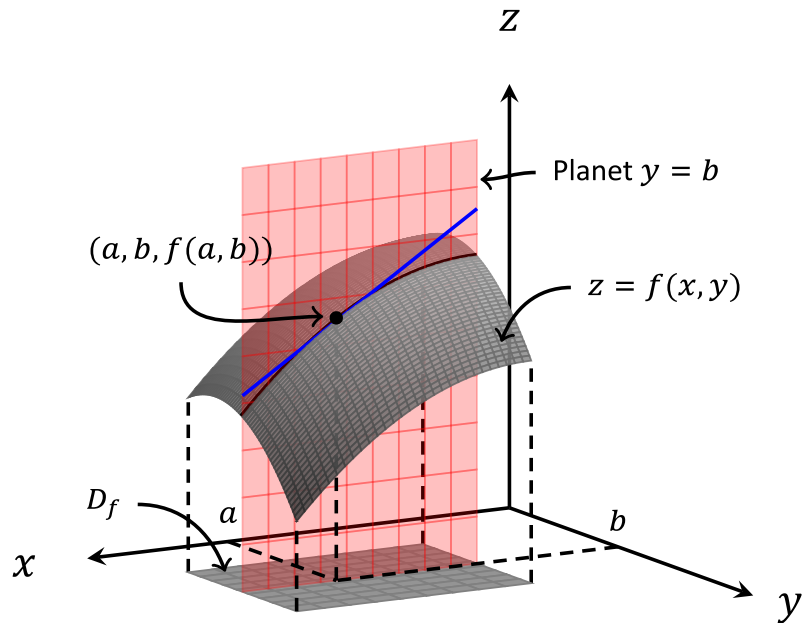
$$f(x, y) = c$$

nivåkurven til  $f$  i høyde  $c$ ,  
der  $c \in V_f$ .

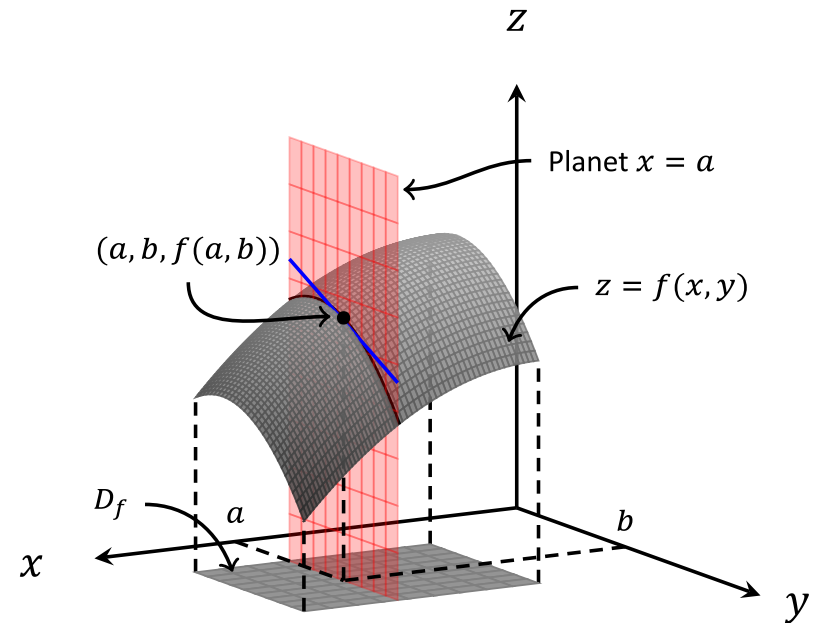


<https://s.ntnu.no/nivaakurver>

# Partiellderivasjon

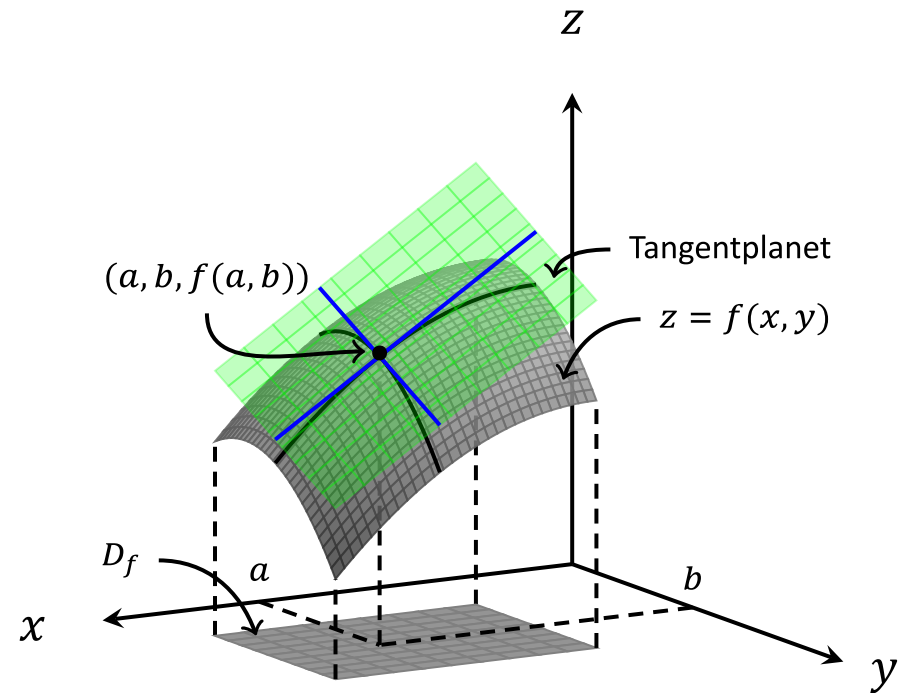
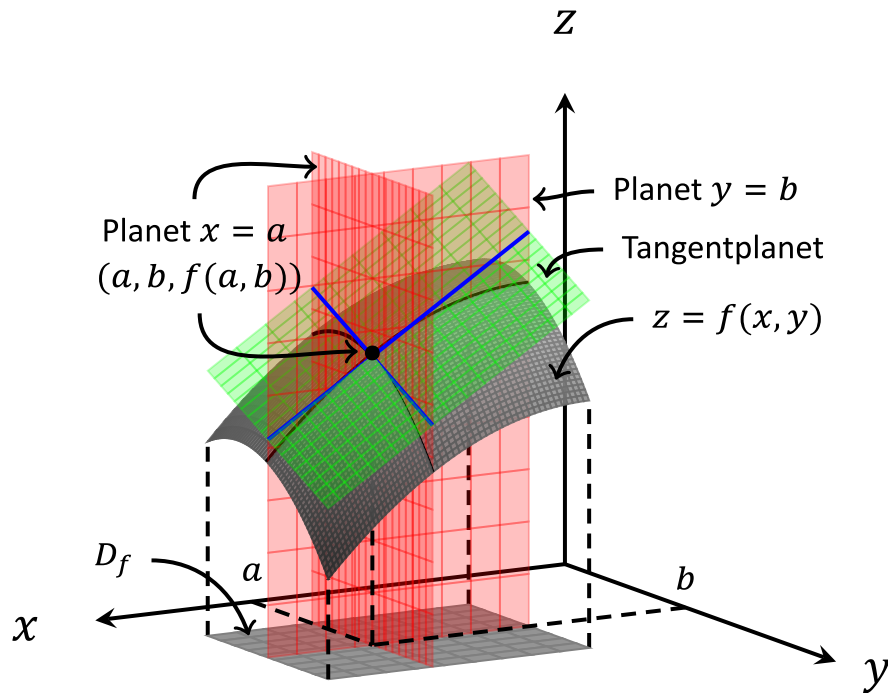


$$\frac{\partial f}{\partial x}(a, b) = \lim_{h \rightarrow 0} \frac{f(a + h, b) - f(a, b)}{h}$$



$$\frac{\partial f}{\partial y}(a, b) = \lim_{h \rightarrow 0} \frac{f(a, b + h) - f(a, b)}{h}$$

# Tangentplan



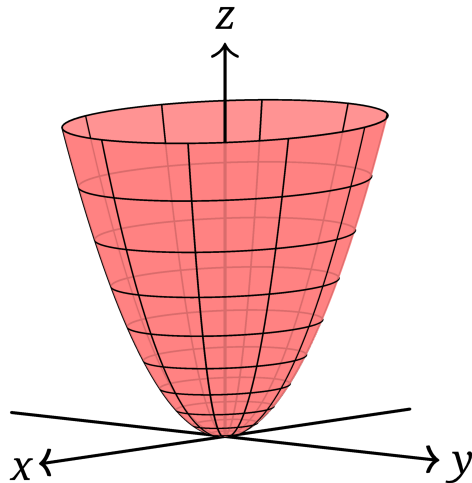
$$z = f(a, b) + \frac{\partial f}{\partial x}(a, b)(x - a) + \frac{\partial f}{\partial y}(a, b)(y - b)$$

# Kvadratiske flater

En kvadratisk flate er en flate gitt ved

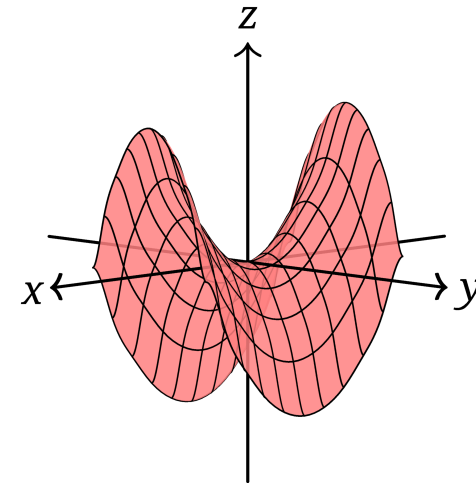
$$Ax^2 + By^2 + Cz^2 + Dxy + Exz + Fyz + Gx + Hy + Iz = J$$

der  $A, B, \dots, J \in \mathbb{R}$ .



$$z = x^2 + 4y^2$$

Elliptisk paraboloid



$$z = x^2 - y^2$$

Sadelflate (=hyperbolsk paraboloid)