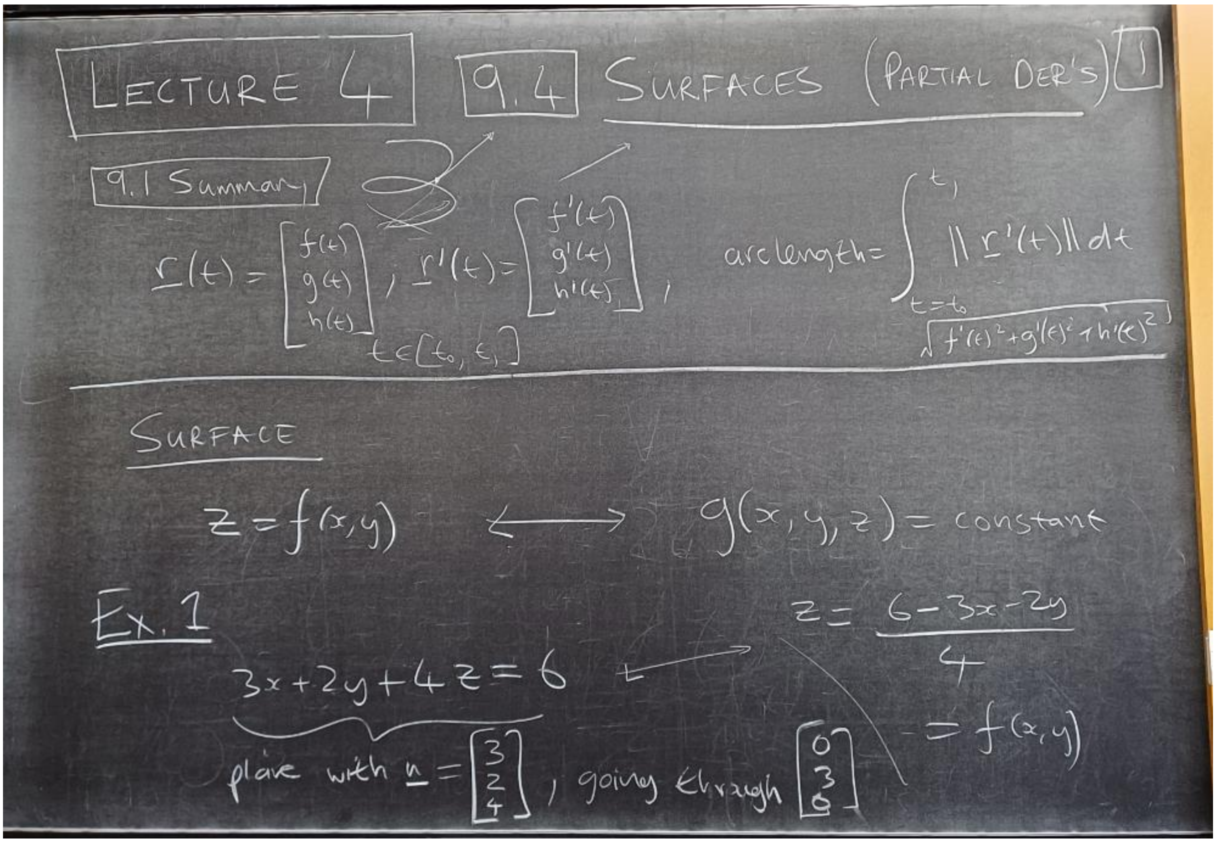
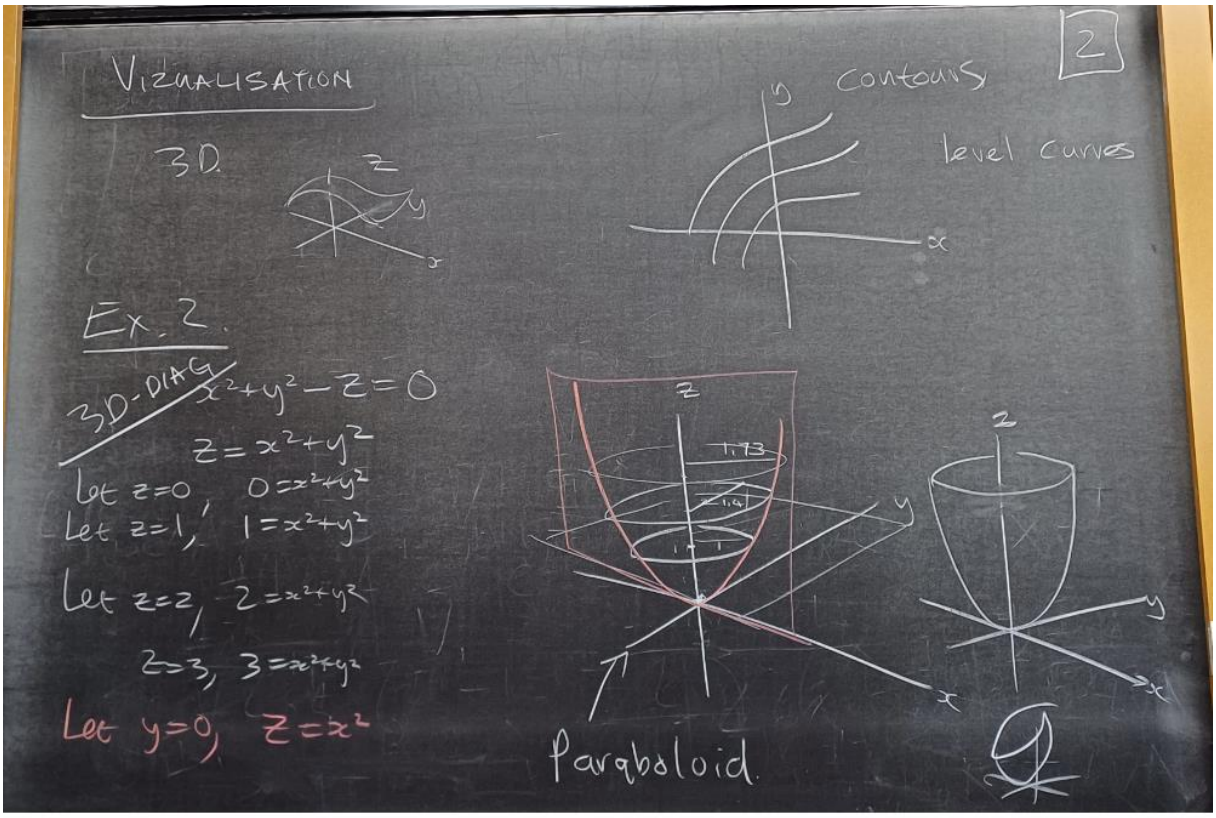
Appl.Maths. B242-2023: **LECTURE 04**





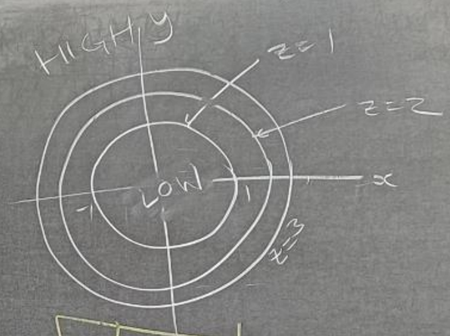
3

CONTOURS

$z = x^2 + y^2$

Let $z=1$, $x^2+y^2=1$

$z=3$, $x^2+y^2=(1.73)^2$



Ex 3: $z = x^2 + \frac{1}{2}y$

$y = -2x + 2z$

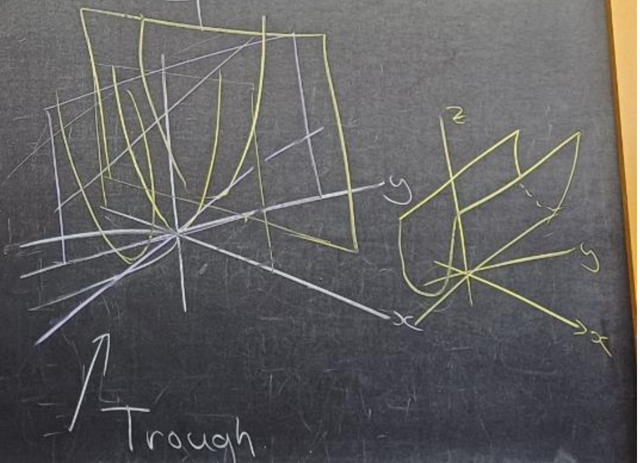
3D-DIAG

$z=0$, $y=-2x^2$

$y=0$, $z=x^2$

$x=0$, $z=\frac{1}{2}y$

$y=1$, $z=x^2+\frac{1}{2}$



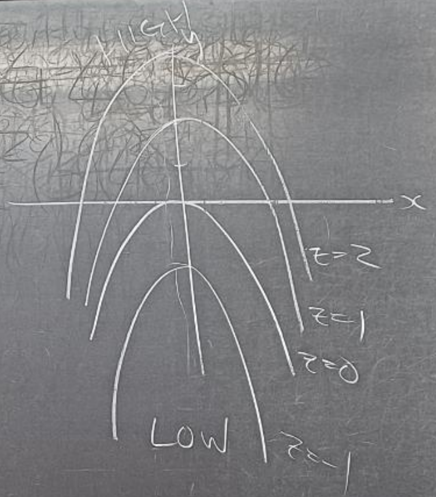
4

CONTOURS

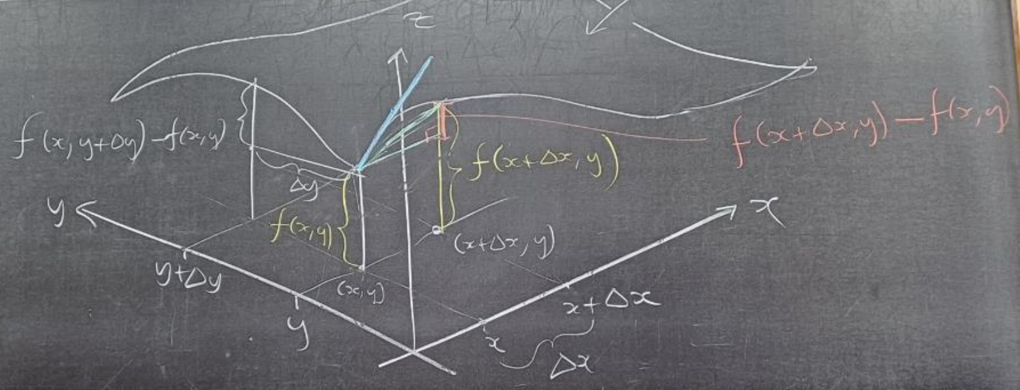
Let $z=0$, $y=-2x^2$

Let $z=1$, $y=-2x^2+2$

Let $z=2$, $y=-2x^2+4$



PARTIAL DER'S $z = f(x,y)$ 5



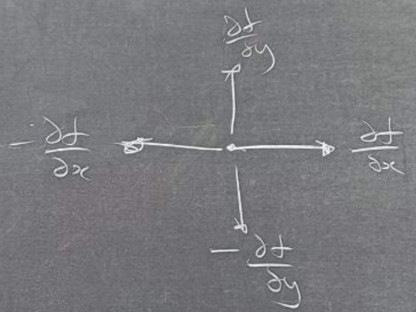
$$\frac{f(x+\Delta x,y)-f(x,y)}{\Delta x} = \text{slope of green line}$$

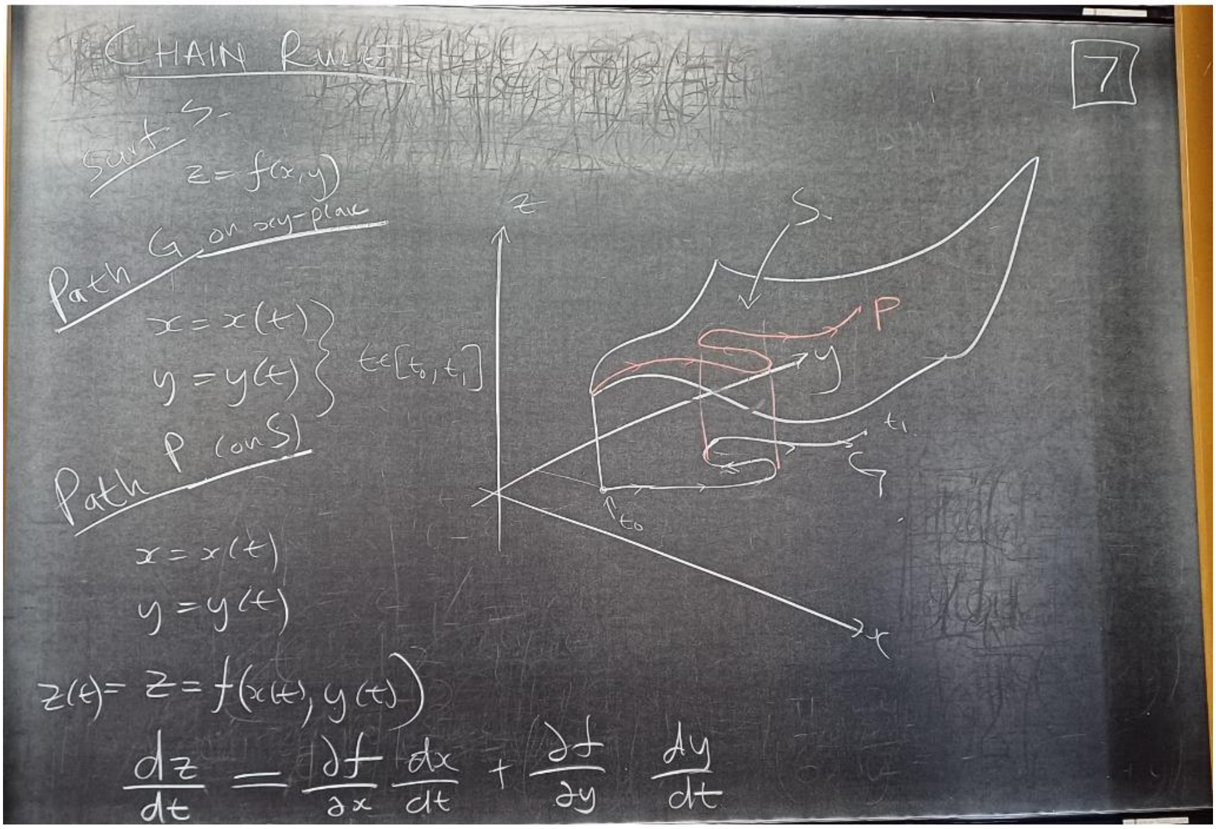
$$\frac{\partial f}{\partial x} = \lim_{\Delta x \to 0} \frac{f(x+\Delta x,y)-f(x,y)}{\Delta x} = \text{slope of tangent line}$$

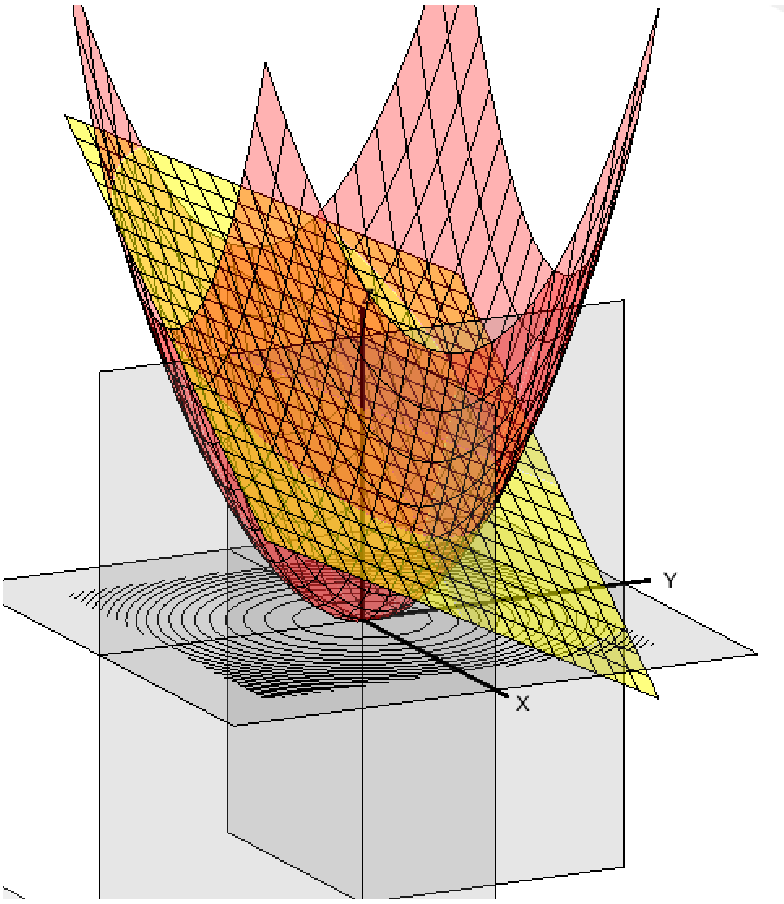
"slope in eastward directn

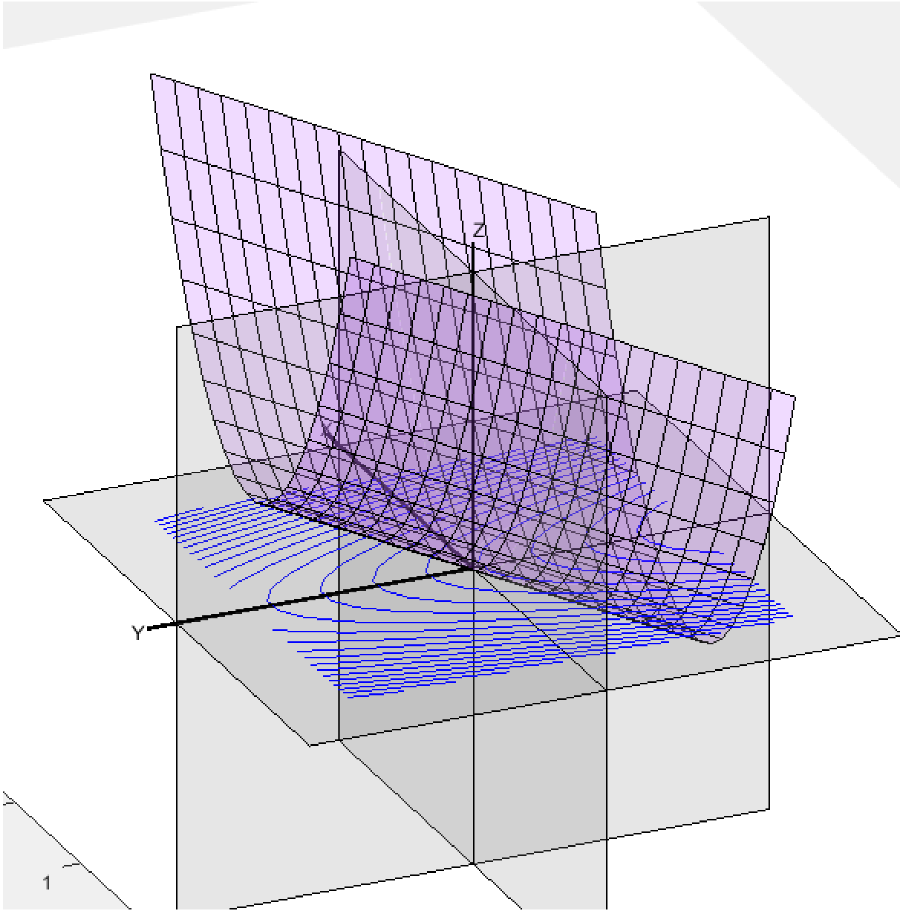
6

$$\frac{\partial f}{\partial y} = \lim_{\Delta y \to 0} \frac{f(x,y+\Delta y)-f(x,y)}{\Delta y} = \text{slope northword}$$




CHAIN RULE
7
surf. S.
z = f(x,y)
Path C on xy-plane
x = x(t)
y = y(t)
t∈[t0,t1]
Path P (on S)
x = x(t)
y = y(t)
z(t) = z = f(x(t), y(t))
dz/dt = ∂f/∂x dx/dt + ∂f/∂y dy/dt
z
S.
P
y
t1
C
t0
x


Y
X


Z
Y
1