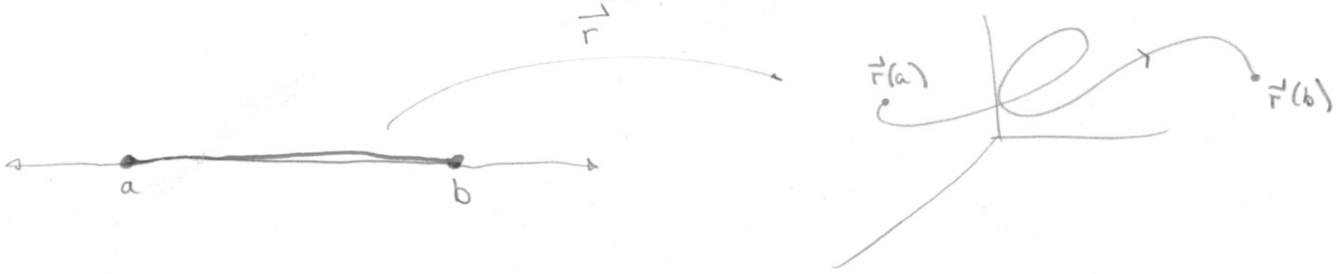
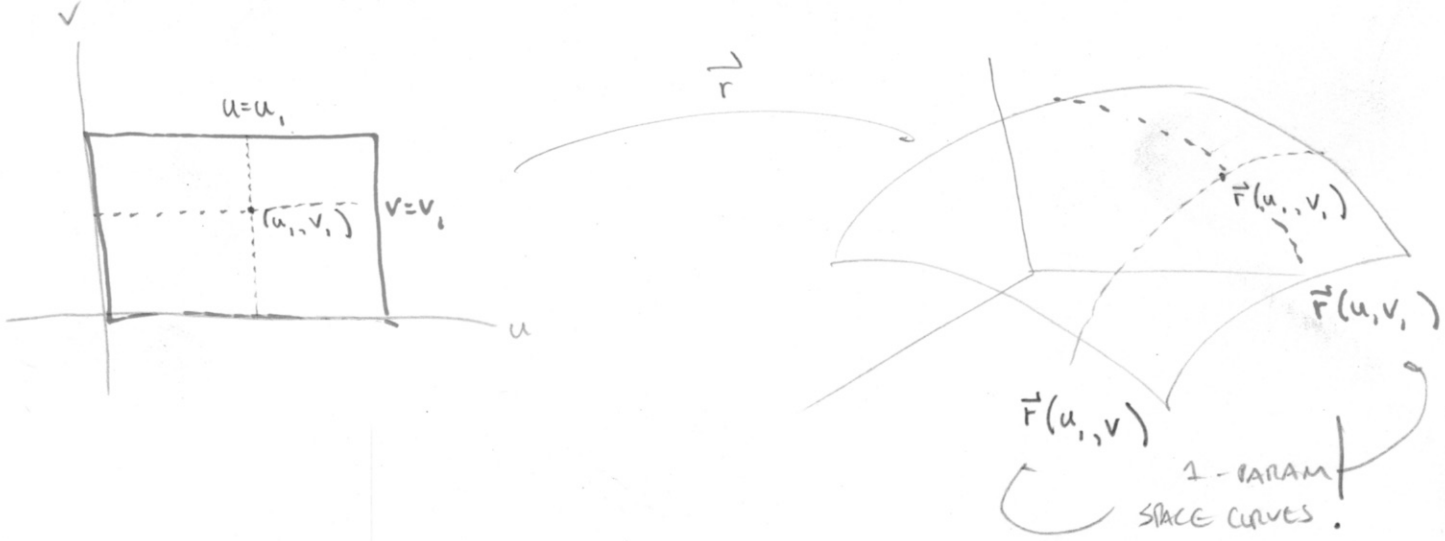
§ 13,6 PARAMETRIC SURFACES (1ST TIME)

SPACE CURVE $\vec{r}(t)$ VECTOR FUNCTION OF A SINGLE PARAMETER

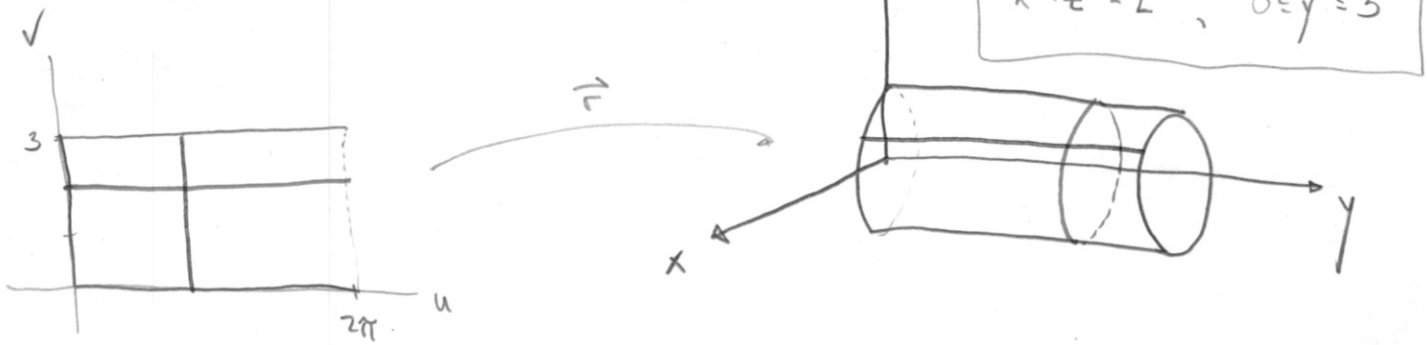


SURFACE $\vec{r}(u,v)$ VECTOR FUNCTION OF TWO PARAMETERS



e.g. $\vec{r}(u,v) = \langle 2\cos u \;,\; v \;,\; 2\sin u \rangle$

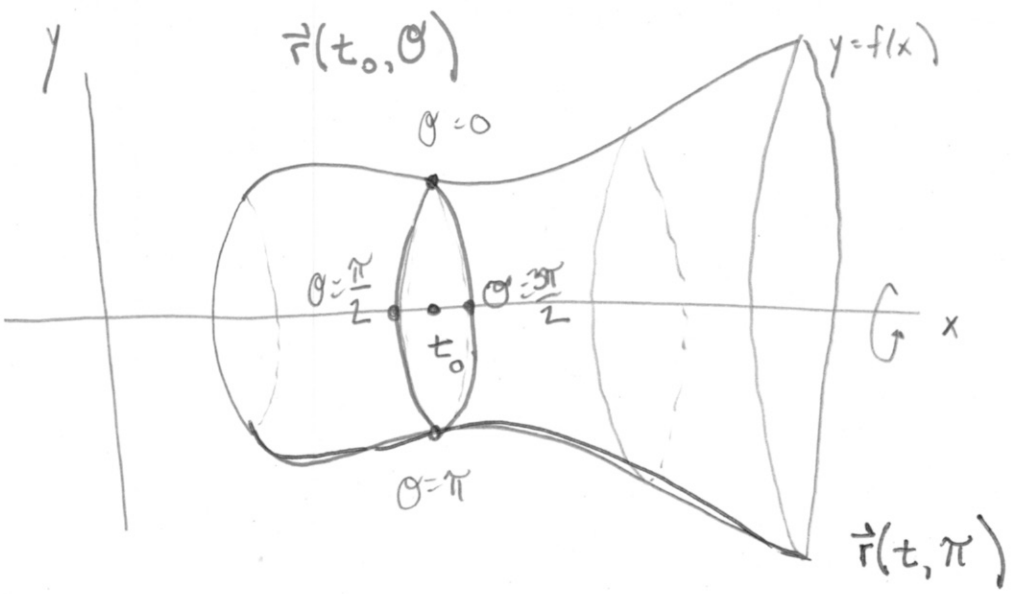
$0 \le u < 2\pi \quad , \quad 0 \le v \le 3$



CYLINDER

$x^2 + z^2 = 2^2 \quad , \quad 0 \le y \le 3$

MORE: $\vec{r}(u,v) = \langle u, v, 2u - 3v \rangle$, $\vec{r}(u,v) = \langle u, u\cos v, u\sin v \rangle$



(x, y, z) IS ON THE SURFACE OBTAINED BY ROTATING $y = f(x)$ ABOUT THE X-AXIS IF $y^2 + z^2 = f(x)^2$

$$y = f(x)\cos\theta \qquad z = f(x)\sin\theta$$

NOW SET $x = t$

$y = f(x)$, $a \le x \le b$, ROTATED ABOUT X-AXIS:

$$\vec{r}(t, \theta) = \langle t, f(t)\cos\theta, f(t)\sin\theta \rangle$$

$$a \le t \le b, \quad 0 \le \theta < 2\pi$$