

$$f(x) = 0$$

$$f(x - x_0) = 0$$

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

$$\begin{bmatrix} 2x \\ 2y \\ 2z \end{bmatrix} \begin{matrix} f_x \\ f_y \\ f_z \end{matrix}$$

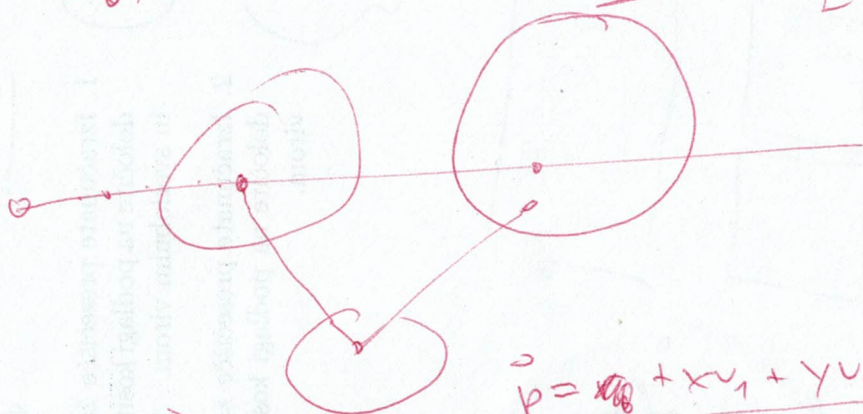
$$f(x) = 0$$

$f(x)$
 $\text{grad } f(x)$

ellipsoid

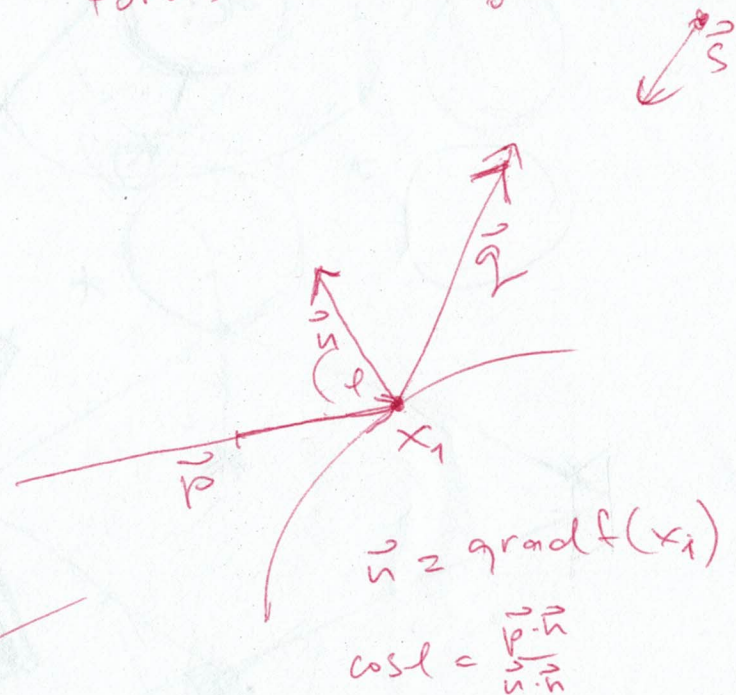
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1 \Rightarrow 1 = 0$$

focus :



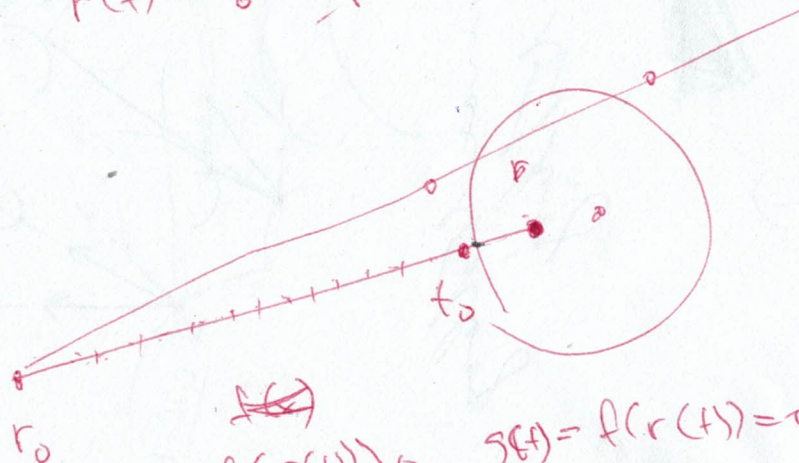
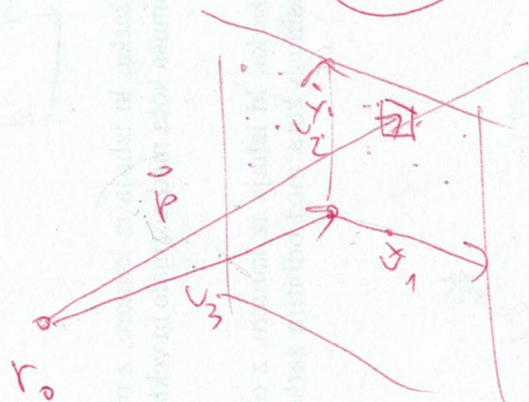
$$\vec{p} = x\vec{v}_1 + y\vec{v}_2 + z\vec{v}_3$$

$$r(t) = r_0 + t\vec{p}$$



$$\vec{n} = \text{grad } f(x_1)$$

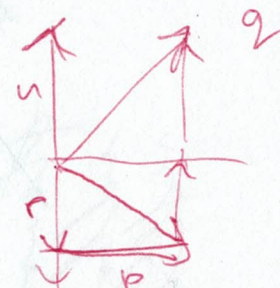
$$\cos \phi = \frac{\vec{p} \cdot \vec{n}}{|\vec{p}| |\vec{n}|}$$



$$f(r(t)) > 0$$

$$g(t) = f(r(t)) = 0$$

$$t_{n+1} = t_n - \frac{g(t_n)}{g'(t_n)}$$



$$\vec{r} = \frac{\vec{p} \cdot \vec{n}}{|\vec{n}|^2} \vec{n}$$

$$\vec{f} = \vec{p} - 2\vec{r}$$