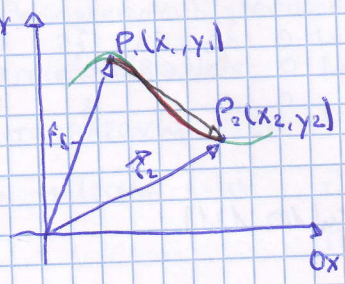
2. KINEMATIKA

1. GAIA: Higidurak

1.1: IBILBIDEA, POSIZIOA ETA DESPLAZAMENDUA



- Ibilbidea
- P(x, y) posizioa
- $\vec{r}$ posizio bektoreal $\vec{r} = x\vec{i} + y\vec{j}$ (m) { · Norabidea · Norantza · Modulua } $|\vec{r}| = \sqrt{x^2 + y^2}$
- Desplazamendu bektorea $\Delta\vec{r}$
- Distantzia Δs
- $\vec{r}(t) = x(t)\vec{i} + y(t)\vec{j}$ $\begin{cases} x = x(t) \\ y = y(t) \end{cases}$ ekuazio parametrikoa → $f(x, y) = 0$ Ibilbidearen ekuazioa

Adib: Higidurearen ekuazioa $\vec{r} = t^2\vec{i} + (t+2)\vec{j}$ (m)

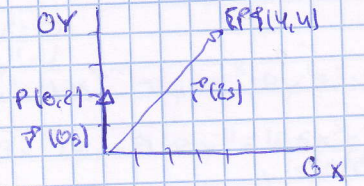
- Posizioa hasieran eta $t = 2s$

$t = 0 \rightarrow \vec{r} = 2\vec{j}$ (m) P(0, 2)

$t = 2s \rightarrow \vec{r} = 4\vec{i} + 4\vec{j}$ (m) P(4, 4)

Ekuazio parametrikoa $\begin{cases} x = t^2 \\ y = t + 2 \end{cases}$ → Ibilbidearen ekuazioa

$t = \sqrt{x} \rightarrow y = \sqrt{x} + 2$

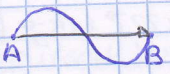


Desplazamendua eta distantzia:

1. Kasua

$|\Delta\vec{r}| = \Delta s$

2. Kasua



$|\Delta\vec{r}| \neq \Delta s$

3. Kasua $A = B$

$|\Delta\vec{r}| = 0$

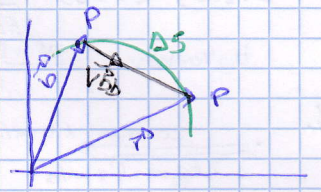
$\Delta s \neq 0$

1.2. ABIADURA (2.1.9.ar)

- Batazbesteko abiadura $\vec{V}_{bb} = \frac{\Delta \vec{r}}{\Delta t}$ (m/s)

- Bataz besteko bigkortasuna $|\vec{V}_{bb}| = \frac{\Delta s}{\Delta t}$ (m/s)

$V = s/t$



2.1.9. ariketa (3 adib)

Iparra → 120 km $t = 2$ h $\vec{r}_0 (0,0)$

Ekia → 180 km $t = 4$ h $\vec{r}_1 (0, 180)$

$\vec{r}_2 (180, 120)$

a) $\vec{V}_{bb} = \frac{\Delta \vec{r}}{\Delta t} = \frac{\vec{r}_1 - \vec{r}_0}{\Delta t} = \frac{120\vec{j}}{2h} = 60\vec{j}$ km/h

b) $\vec{V}_{bb} = \frac{\Delta \vec{r}}{\Delta t} = \frac{\vec{r}_2 - \vec{r}_0}{\Delta t} = \frac{180\vec{i} + 120\vec{j}}{6h} = 30\vec{i} + 20\vec{j}$ (km/h)

- Aldiuneko abiadura

$$\vec{V} = \lim_{\Delta t \to 0} \frac{\Delta \vec{r}}{\Delta t} = \frac{d\vec{r}}{dt} \text{ (m/s)}$$

Deribatuak

$y = 3 \rightarrow y' = 0$

$y = x \rightarrow y' = 1$

$y = x^n \rightarrow y' = n \cdot x^{n-1} \rightarrow y = x^3 \rightarrow y' = 3x^2$

$y = 5x^4 - 3x^2 + 5x - 9 \rightarrow y' = 4 \cdot 5x^3 - 3 \cdot 2x + 5 \cdot 1$

$y' = 20x^3 - 6x + 5$

1.3: AZELERAZIOA (2Ig.er)

- Batazbesteko azeleragioa $\vec{a}_{bb} = \frac{\Delta \vec{v}}{\Delta t}$ (m/s^2)
- Aldiuneko azeleragioa $\vec{a} = \lim_{\Delta t \to 0} \frac{\Delta \vec{v}}{\Delta t} = \frac{d\vec{v}}{dt}$ (m/s^2)