Points

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First Stage

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Points

- Point: position in nD space
- Notation: **P** (H&B), also P, **p**, p en $\underline{\mathrm{p}}$
- (x,y,z) (H&B), also (x_1, x_2, x_3), (P_x, P_y, P_z), (r, θ, z), (r, θ, φ), …

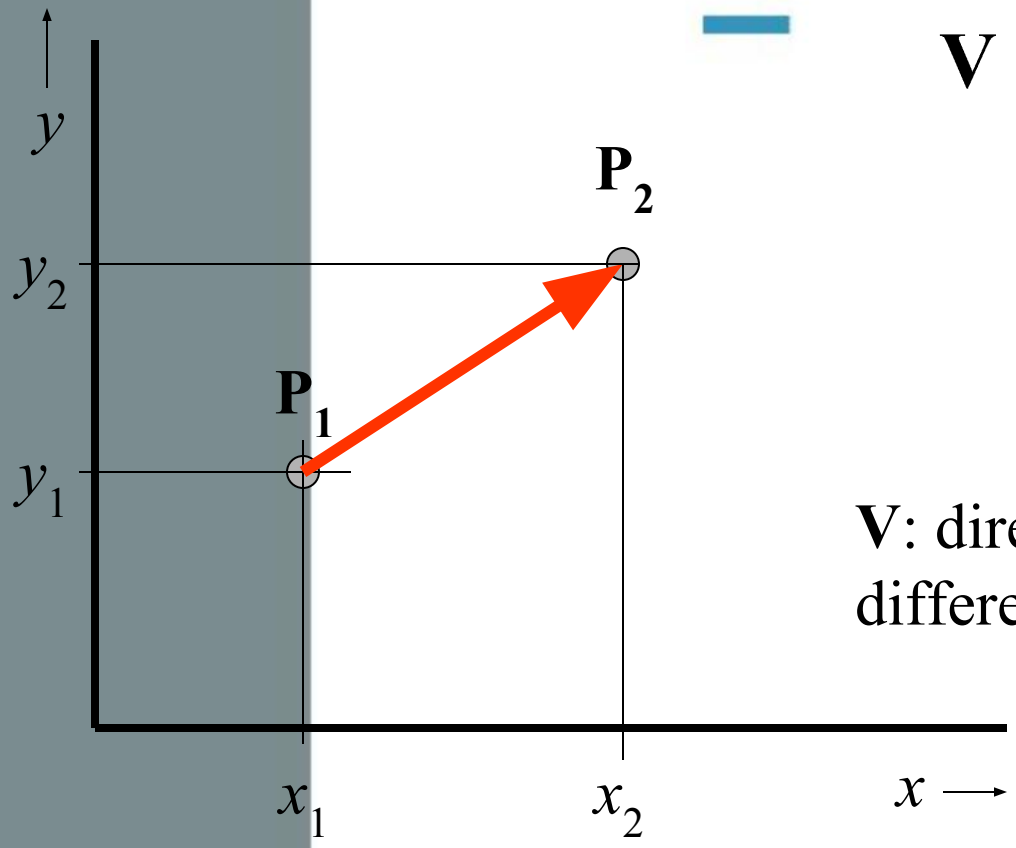
H&B A-2

Vectors 1

- Vector:
  - "arrow"
  - multiple interpretations (displacement, velocity, force, …)
  - has a magnitude and direction
  - has *no* position
- Notation: **V** (H&B), also V, **v**, *v* en $\underline{\mathrm{v}}$
- (V_x, V_y, V_z) (H&B), also (x, y, z), (x_1, x_2, x_3)

H&B A-2

Vectors 2



$$\mathbf{V} = \mathbf{P}_2 - \mathbf{P}_1$$
$$= (x_2 - x_1, y_2 - y_1)$$
$$= (V_x, V_y)$$

V: directed line segment, or difference between two points

H&B A-2

Vectors 3

Length of a vector:

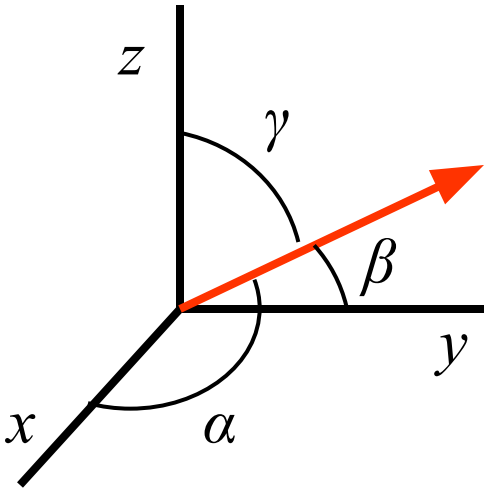
$$|\mathbf{V}| = \sqrt{V_x^2 + V_y^2} \quad (2\mathrm{D}:\mathrm{Pythagoras})$$

$$|\mathbf{V}| = \sqrt{V_x^2 + V_y^2 + V_z^2} \quad (3\mathrm{D})$$

Vectors 4

Direction of a vector: Direction angles.

$$\cos\alpha = \frac{V_x}{|\mathbf{V}|}, \cos\beta = \frac{V_y}{|\mathbf{V}|}, \cos\gamma = \frac{V_z}{|\mathbf{V}|}$$



Unit vector $\overline{\mathbf{V}}$:

$$\overline{\mathbf{V}} = \frac{\mathbf{V}}{|\mathbf{V}|}$$

Magnitude info is removed, direction is kept.

H&B A-2