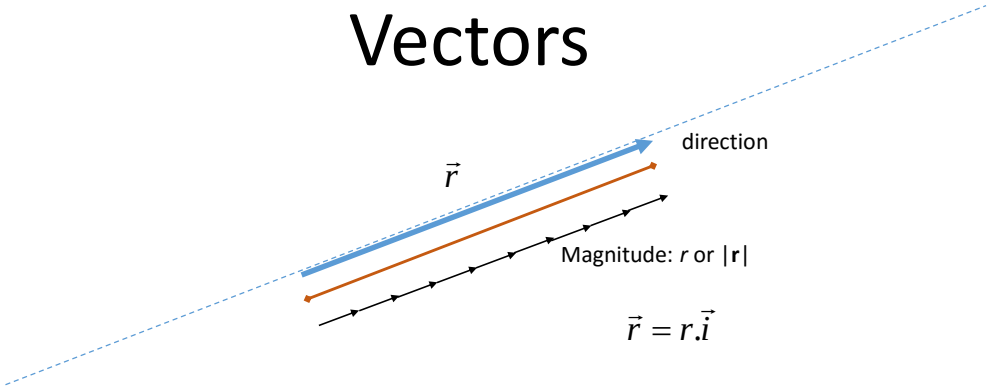
Vectors

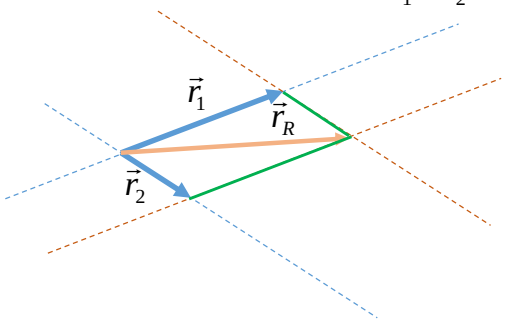


$$\vec{r} = r.\vec{i}$$

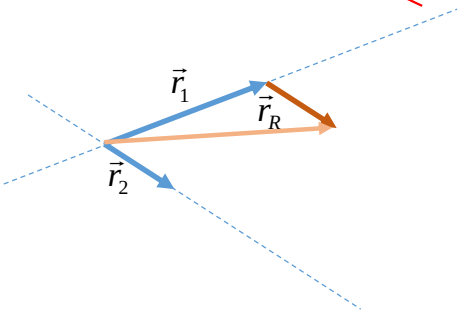
$\vec{i}$ Unit vector

Adding vectors:

$$\vec{r}_1 + \vec{r}_2 = \vec{r}_R$$



WATCH OUT! NOT THE SAME AS: ~~$r_1 + r_2 = r_R$~~

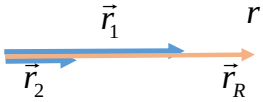


$$r = \sqrt{r_1^2 + r_2^2 + 2r_1 r_2 \cos\alpha}$$

Angle between r_1 and r_2

Special cases:

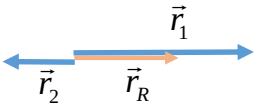
The two vectors have the same direction:



$$r = \sqrt{r_1^2 + r_2^2 + 2r_1 r_2 \cos 0°}$$

$$r^2 = r_1^2 + 2r_1 r_2 + r_2^2 \qquad r = r_1 + r_2$$

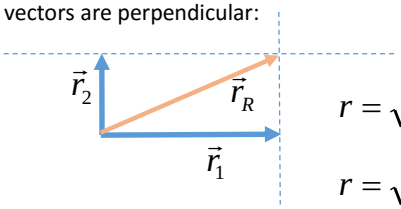
The two vectors have the opposite direction:



$$r = \sqrt{r_1^2 + r_2^2 + 2r_1 r_2 \cos 180°}$$

$$r^2 = r_1^2 - 2r_1 r_2 + r_2^2 \qquad r = r_1 - r_2$$

The two vectors are perpendicular:



$$r = \sqrt{r_1^2 + r_2^2 + 2r_1 r_2 \cos 90°}$$

$$r = \sqrt{r_1^2 + r_2^2}$$