

# Rigid body dynamics

- Coriolis acceleration

$$\vec{a}_p = \vec{a}_o + \frac{{}^b d^2}{dt^2} \vec{r} + \underbrace{2\vec{\omega}_{ib} \times \frac{{}^b d}{dt} \vec{r}}_{\text{Coriolis acceleration}} + \underbrace{\vec{\alpha}_{ib} \times \vec{r}}_{\text{Euler acceleration}} + \underbrace{\vec{\omega}_{ib} \times (\vec{\omega}_{ib} \times \vec{r})}_{\text{Centrifugal acceleration}}$$

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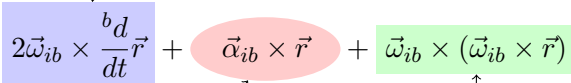
- Coriolis acceleration

$$\vec{a}_p = \vec{a}_o + \frac{{}^b d^2}{dt^2} \vec{r} + \boxed{2\vec{\omega}_{ib} \times \frac{{}^b d}{dt} \vec{r}} + \textcolor{red}{\vec{\alpha}_{ib} \times \vec{r}} + \textcolor{green}{\vec{\omega}_{ib} \times (\vec{\omega}_{ib} \times \vec{r})}$$

- Transversal acceleration

# Rigid body dynamics

- Coriolis acceleration

$$\vec{a}_p = \vec{a}_o + \frac{b d^2}{dt^2} \vec{r} + 2\vec{\omega}_{ib} \times \frac{b d}{dt} \vec{r} + \vec{\alpha}_{ib} \times \vec{r} + \vec{\omega}_{ib} \times (\vec{\omega}_{ib} \times \vec{r})$$
The equation is displayed with four colored regions: a blue box around the Coriolis term  $2\vec{\omega}_{ib} \times \frac{b d}{dt} \vec{r}$ , a red oval around the transversal acceleration term  $\vec{\alpha}_{ib} \times \vec{r}$ , and a green box around the centripetal acceleration term  $\vec{\omega}_{ib} \times (\vec{\omega}_{ib} \times \vec{r})$ . Arrows point from the text labels below to these specific terms.

- Transversal acceleration
- Centripetal acceleration