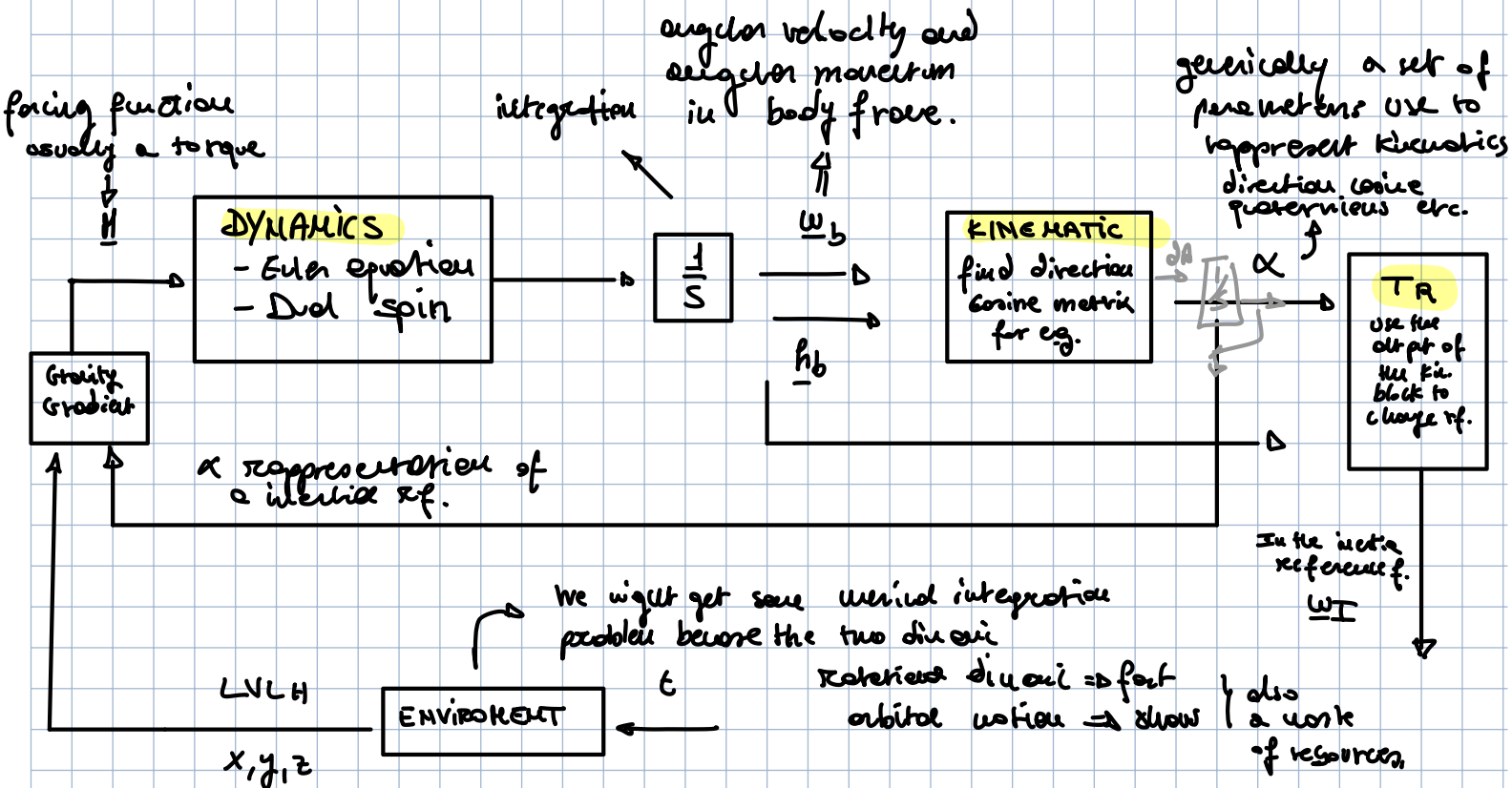
SPACECRAFT DYNAMICS

Where we are now?



The enviroment as a function of time. The orbital motion of the space craft if integrated will give as an output the local vertical and the local horizontal as well the absolute position of the s/c with reference to the main attractor.

We have already seen the gravity gradient and how to model it.

We will see how to model and introduce another perturbation relative to the absolute position of the s/c.

Risposte Alle domande

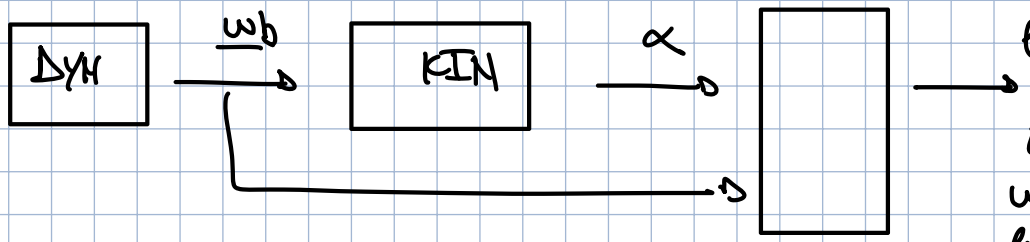
$$\frac{dA}{dt} = -\omega \wedge A$$

$$A(t+\Delta t) = \int_t^{t+\Delta t} \frac{dA}{dt}\, dt \quad \rightarrow \quad \text{small numerical error}$$

$$A(t+\Delta t)^T A(t+\Delta t) = (I + \varepsilon)$$

↳ because $A(t+\Delta t)$ should be a direction cosine matrix that is orthonormal

we must check that after the integration we still have an orthogonal matrix in order to better represent the physical phenomena that I'm trying to model.



$[1\ 0\ 0]$ not aligned with $\underline{h}_I$ we need to change new initial condition of the kinematics. So when we capture the angular momentum is aligned with the x axis of the inertial reference frame.

α

$$\underline{h}_b = \underline{\underline{I}}\,\underline{\omega}_b$$

$$\underline{h}_I = \begin{bmatrix} |h| \\ 0 \\ 0 \end{bmatrix}$$ ← we want this