

Initialise

$$\mathbf{h}(t_0) = \begin{bmatrix} \vec{\mathbf{o}}_m \\ f_x(\vec{\mathbf{x}}(t_0)) \\ \vec{\mathbf{o}}_z \\ \vec{\mathbf{o}}_q \end{bmatrix}$$

(A) Integrate

$$\mathbf{h}(t_{k-1}) = \begin{bmatrix} \mathbf{h}_m \\ \mathbf{h}_x \\ \mathbf{h}_z \\ \mathbf{h}_q \end{bmatrix} (t_{k-1})$$

$$\int_{t_{k-1}}^{t_k} f_d(\mathbf{h}(t), \mathbf{u}(t)) dt$$

$$\mathbf{h}(t_k^-) = \begin{bmatrix} \mathbf{h}_m \\ \mathbf{h}_x \\ \mathbf{h}_z \\ \mathbf{h}_q \end{bmatrix} (t_k^-)$$

(C) Update

$$\mathbf{h}(t_k) = f_u \left(\mathbf{h}(t_k^-), \hat{\mathbf{z}}(t_k), \mathbf{z}(t_k), \mathbf{m}(t_k) \right)$$

(B) Predict

$$\hat{\mathbf{q}}(t_k) = g_z(\mathbf{h}_q(t_k^-))$$

$$\hat{\mathbf{z}}(t_k) = g_z(\mathbf{h}_z(t_k^-))$$