

THE MALCOLM D. SHUSTER ASTRONAUTICS SYMPOSIUM

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$$R(\hat{n}, \theta) = I_{3 \times 3} + (\sin \theta) [[\hat{n}]] + (1 - \cos \theta) [[\hat{n}]]^2 = \exp \{ [[\theta \hat{n}]] \}$$

$$A^{* \text{ TRIAD}} = [\hat{s}_1 \ \hat{s}_2 \ \hat{s}_3] [\hat{r}_1 \ \hat{r}_2 \ \hat{r}_3]^T \quad \diamond \quad J(A) = \frac{1}{2} \sum_{k=1}^N a_k |\hat{W}_k - A \hat{V}_k|^2$$

$$B = \sum_{k=1}^N a_k \hat{W}_k \hat{V}_k^T \quad \diamond \quad J(A) = \lambda_o - \text{tr} [B^T A] \quad \diamond \quad K q^* = \lambda_{\max} q^*$$

$$a_k = \lambda_o \sigma_{\text{tot}}^2 / \sigma_k^2 \quad \diamond \quad \hat{W}_k \sim \mathcal{N} \left(A^{\text{true}} \hat{V}_k, \sigma_k^2 (I_{3 \times 3} - \hat{W}_k^{\text{true}} \hat{W}_k^{\text{true}T}) \right)$$

$$\lambda_{\max} = \lambda_o \left(1 - \frac{1}{2} \sigma_{\text{tot}}^2 \chi^2(2N - 3) \right) \quad \diamond \quad B = U S V^T \quad \diamond \quad A = U V^T$$

$$(P_{\theta\theta}^{-1})^{\text{QUEST}} = \sum_{k=1}^N \frac{1}{\sigma_k^2} \left(I_{3 \times 3} - \hat{W}_k^{\text{true}} \hat{W}_k^{\text{true}T} \right) \quad \diamond \quad q_{k|k} = \delta q(\underline{\epsilon}_{k|k}) \circ q_{k|k-1}$$

$$\underline{\epsilon}_{k|k} = P_{k|k} [[\hat{W}_{k|k-1}]] \hat{W}_k / \sigma_k^2 \quad \diamond \quad p_{\underline{\xi}}(\underline{\xi}') = \frac{1}{\pi^2} \left| \frac{\partial q(|q|, \underline{\xi}')}{\partial (|q|, \underline{\xi}')} \right|_{|q|=1}$$

$$B = \left[\frac{1}{2} (\text{tr} P_{\theta\theta}^{-1}) I_{3 \times 3} - P_{\theta\theta}^{-1} \right] A^* \quad \diamond \quad K = \lambda_{\max} I_{4 \times 4} - 2 \Xi (q^*) P_{\theta\theta}^{-1} \Xi^T (q^*)$$

$$z_{i,j,k} \equiv (\hat{W}_{i,k}^o \cdot \hat{W}_{j,k}^o) - \hat{V}_{i,k} \cdot \hat{V}_{j,k} = (\hat{W}_{i,k}^o \times \hat{W}_{j,k}^o) \cdot (\underline{\theta}_i - \underline{\theta}_j) + \Delta z_{i,j,k}$$

$$B_{k|k-1} = \beta_k \Phi_k B_{k-1|k-1} \quad \diamond \quad J(\underline{b}) = \sum_{k=1}^N |z_k - 2 \underline{B}_k \cdot \underline{b} - \mu_k|^2 / (2 \sigma_k^2)$$

$$B_{k|k} = B_{k|k-1} + \hat{W}_k \hat{V}_k^T / \sigma_k^2 \quad \diamond \quad \bar{J}(\underline{b}) = |z - 2 \underline{B} \cdot \underline{b} + |\underline{b}|^2 - \mu|^2 / (2 \sigma^2)$$

$$R(\hat{n}_1, \hat{n}_2, \hat{n}_3 : \varphi_1, \varphi_2, \varphi_3) = C^T R(\hat{1}, \lambda) R_{3 \times 3}(\varphi, \vartheta - \lambda, \psi) C$$

$$B = \sum_{k=1}^3 \hat{W}_k^{\text{eq}} \hat{V}_k^{\text{eq}T} / (\sigma_k^2)^{\text{eq}} \quad \diamond \quad \epsilon \left[\frac{d}{dt} \right] = I_{3 \times 3} \frac{d}{dt} - [[\epsilon \underline{\omega} \epsilon]]$$

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