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Student Satellite Project
Indian Institute of Technology, Bombay
Powai, Mumbai - 400076, INDIA

Website: www.aero.iitb.ac.in/satlab

README - q-Davenport Algorithm

Guidance, Navigation and Controls Subsystem

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es_main_qdp.m

Code Type: MATLAB - Script
Code author: Shashank Singh
Created on: 29/04/2020
Last modified: –/–/—-
Reviwed by: NOT YET REVIEWED!
Description:
This is the main script, which runs the q-Davenport Algorithm.
Formula & References:
Reference: **Chapter 5,** Fundamentals of Spacecraft Attitude Determination and Control Authors: Markley, F. Landis, Crassidis, John L.
Input parameters:
The input arguments to the function are read from the **Input** folder. Here **N** refers to the number of input stars.

1. **es_input.mat** : The contents of which are-
    - **st_op_bi** : ((N, 3) - Matrix) - The body-frame vectors - (X,Y,Z), of the matched stars
    - **st_op_ri** : ((N, 3) - Matrix) - The inertial-frame vectors - (X,Y,Z), of the corresponding matched stars
    - **n_st_strs** : (Integer) - The number of stars matched by Star Matching

Output:
Writes the final estimated quaternion using q-Davenport into **es_q_bi.csv** file in the **Output** folder.

es_qdp.m

Code Type: MATLAB - Function
Code author: Shashank Singh
Created on: 29/04/2020
Last modified: –/–/—-
Reviwed by: NOT YET REVIEWED!
Description:
This is the main and the only function in the Q-Davenport algorithm. It calculates the **final estimated quaternion**.

Formula & References:
Reference: **Chapter 5,** Fundamentals of Spacecraft Attitude Determination and Control Authors: Markley, F. Landis, Crassidis, John L.
Input parameters: Here **N** refers to the number of input stars.

1. **b_m** : ((N, 3) - Matrix) - The body-frame vectors - (X,Y,Z), of the matched stars
2. **m_r** : ((N, 3) - Matrix) - The inertial-frame vectors - (X,Y,Z), of the corresponding matched stars
3. **v_a** : ((N, 1) - Vector) - The weights of the corresponding matched stars

Output:
q_bi : ((4,1) - Vector) - The final estimated quaternion, using q-Davenport algorithm.