Equal-chord attitude determination method for spinning spacecraft

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Abstract: The Equal-Chord Method offers a straightforward and low-cost technique for the determination of the spin axis attitude using Sun and Earth sensor data. The Earth aspect angle follows from the time at which the chord-lengths measured by the Earth sensor's two pencil-beams are equal. An estimation technique is not required but linear or quadratic fitting of the sensor data should be performed to remove the random errors. The accuracy of the attitude solution obtained by the equal-chord method in the presence of the relevant biases is evaluated. The result is insensitive to uniform biases in the measured chord angles, caused for instance by errors in the Earth's infra-red horizon. Finally, the application of the method is demonstrated using actual flight data of the CONTOUR spacecraft.

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