



Making an Attitude Adjustment

Although no one has to parallel park the International Space Station, it and other spacecraft often require precise steering movements to rotate from one orientation to another. These rotations are not simple, involving movement through three dimensions. Some spacecraft use thrusters to execute a maneuver, while others use angular momentum stored in gyroscopes or similar devices. The spacecraft's flight software performs the necessary calculations, typically using quaternion algebra (based on an extension of the complex numbers) to find a path to reorient the craft. Minimizing fuel and time, neither of which is unlimited, requires finding optimal paths that are determined by solving ordinary differential equations.



Image: NASA.

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