Spacecraft Differential Games in the Hill Reference Frame

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In this seminar, optimal control of spacecraft relative motion from a differential-game-theoretic point of view is discussed. A pursuit-evasion game is a classic example of a two-player differential game. In this game, a player 1 is trying to pursue and ultimately capture player 2 with minimum control effort while player 2 is trying to evade player 1. The analysis of differential games is simplified if the dynamics is linear and if the performance criteria are quadratic. These types of games are known as linear-quadratic (LQ) differential games. Various types of LQ differential games will be discussed. The dynamics of the spacecraft relative motion is simplified if instead of an Earth-centered reference frame, a frame centered on an orbit around the earth is used. This frame is known as the Hill reference frame.