

Optimal rendezvous with proportional navigation unmanned aerial vehicle

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Abstract: Two-dimensional optimal rendezvous problem with proportional navigation unmanned aerial vehicle is analyzed using a non-linear model. The velocities of both players have a constant modulus, but vary in direction. The problem is to minimize the final distance between the pursuer and the drone in the transition from the given initial conditions. Meeting time is fixed. Examples include the rendezvous problem for a flying tanker with a drone or intercepting an attacking missile by a defensive missile that simulates the target. The principle of maximum procedure allows to reduce optimal control problem to the problem of analyzing the phase portrait of a system of two nonlinear differential the equations. The qualitative features of the optimal process are determined.

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