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Differential Game of Many Pursuers and Evaders with Integral Constraints on a Cylinder

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Abstract

We consider a simple motion pursuit differential game of m pursuers and k evaders on a cylinder in $\mathbb{R}^3$. Pursuit is said to be completed if the position of each evader coincides with the position of a pursuer at some finite time. We reduce the differential game to a differential game of m groups of countably many pursuers and k groups of countably many evaders in $\mathbb{R}^2$ where all the players from each group are controlled by one control parameter subject to integral constraint. We prove that if the total resource of the pursuers is greater than the total resource of the evaders, then pursuit can be completed. We construct strategies for the pursuers.

Keywords: Differential game on cylinder; integral constraint; many pursuers; evaders; strategy.