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Pursuit-evasion and time-dependent gradient flow in singular spaces.

Pursuit-evasion games are generated from robotics, control theory and computer simulations. $CAT(0)$ and $CAT(K)$ spaces are suitable playing fields, and vastly generalize the usual playing fields in the pursuit-evasion literature. On these spaces, we prove existence and uniqueness theorems for pursuit curves, as well as convergence estimates and a regularity theorem. Recently, time-independent gradient flow has been studied extensively in $CAT(0)$ spaces. Pursuit curves are downward gradient curves for the distance from a moving evader, that is, for a time-dependent gradient flow. We extend our results to more general time-dependent gradient flow in $CAT(0)$ spaces. (Received December 20, 2011)