In my PhD thesis, I have two topics.


Abstract: 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.

2. Cut points of the boundary in low dimensional thin Riemannian manifolds, in preparation.

Abstract: Let M be a complete connected 2 dim (or 3 dim) Riemannian manifold with boundary B. If M has a bound condition of curvature, we will get the lower bound of the distance between cut points of the boundary B having order 3(or order 4 for 3dim case). To show this, I use a global triangle comparison and a CAT(K)-property. As an application, we will investigate a topological property of M dependent on this lower bound.