

On the Proper Generalized Decomposition for Shape Spaces

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Abstract

We propose a novel numerical approach to perform optimal control strategies in robot motion planning. To this end we identify each strategy over the configuration space with a diffeomorphism between compact manifolds and hence it allows us to construct an approach over spaces of diffeomorphisms and shape spaces. Finally we prove that if the configuration space has a fibre bundle structure then we can perform a Proper Generalized Decomposition strategy which allows to capture the principal features of the physical system and to compute the optimal control strategies.

Keywords: Optimal control, Fibre bundles, Proper Generalized Decomposition, Separation of variables

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