

Full paper

Original Design of an Unmanned Ground Vehicle for Exploration in Rough Terrain

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Abstract

This paper introduces an originally designed tracked robot. This robot belongs to the variable geometry single-tracked vehicle (VGSTV) category. Two active joints are used to control the shape of the vehicle and the tension of the tracks. Thus, it becomes possible to adapt the shape of the robot and the ground/robot contact points to the obstacle by controlling the joints. This paper presents some unmanned ground vehicle architectures followed by an analysis of the prototype performance (in comparison with other VGSTVs). A description of its dynamic model is also presented in order to introduce the computation of two balance criteria: center of gravity and zero moment point. Finally, the relevance of these criteria is compared by discussing experimental results in the case of staircase clearing.

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Keywords

Unmanned ground vehicle, variable geometry single-tracked vehicle, tele-operation, clearance capability, balance