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Modello Dinamico di un Veicolo Cingolato
Dynamic Model of an Unmanned Tracked Vehicle

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Abstract

The aim of the thesis is the dynamic model of an off-road tracked vehicle, and the development of a control law for making it autonomous. The target of the design of the control system, is making the vehicle capable to operate in complete safety and autonomy on paths with angles with maximum slope equal to $20°$. The system, called UTV (Unmanned Tracked Vehicle), is designed for transporting goods on uneven terrain with strong gradients. The propulsion is obtained by an internal combustion engine. The vehicle geometry is 180 mm in width, track width of 670 mm and a length of 580mm footprint. The design was developed in SolidWorks environment integrated with the software SimMechanics of Mathworks that allowed us the creation of a multi-body model. This model was used for the design of open loop and closed loop control laws, having defined an appropriate set of actuators and sensors. Control laws, defined in the simulation have been implemented on the machine and, through an identification procedure N4SID we obtained the identified dynamic model. On this last model we developed a feedback optimum control law to make robust control.