



Dynamic Control of the Summit XL Robot

The mobile robot Robotnik Summit XL is a skid-steered robot with four wheels, reaching a maximum speed of around 2.5 m/s. In our group, a new control algorithm has been developed, which uses a terrain-dependent kinematic model, and allows this robot to drive smoothly in outdoor terrain, reaching its maximum speed. Furthermore, the extension of this control algorithm considers the full dynamic model of the vehicle, especially the contact forces between the wheels and the ground.

One of the difficulties which arises is modeling the friction between the wheels and the ground. Using advanced dynamic modeling, such as in Wong [2008], the student needs to implement different dynamic models, and experimentally identify the parameters. This should lead to a good model of the friction between the wheels and the ground. Furthermore, the Summit XL base software does not support dynamic control. This needs to be developed and implemented by the student, so that the currents/torques of each wheel can be controlled individually.

The student should already have attended the “Praktikum: Mobile Roboter”, and the lecture “Mobile Roboter”. Knowledge in C++ and ROS is required, as well as good knowledge in calculus.

Communication with the supervisor is in German or English.

Kontakt

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