

OmniDrive Model of a Holonomic Mobile Robot

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Abstract : In this paper the kinematic and kinetic models of an omnidirectional holonomic mobile robot is presented. The kinematic and kinetic models form the OmniDrive model. Therefore, a mathematical model for the robot equipped with three-omnidirectional wheels is derived. This model which takes into consideration the kinematics and kinetics of the robot, is developed to state space representation. Relative analysis of the velocities and displacements is used for the kinematics of the robot. Lagrange's approach is considered in this study for deriving the equation of motion. The drive train and the mechanical assembly only of the Festo Robotino® is considered in this model. Mainly the model is developed for motion control. Furthermore, the model can be used for simulation purposes in different virtual environments not only Robotino® View. Further use of the model is in the mechatronics research fields with the aim of teaching and learning the advanced control theories.

Keywords : mobile robot, omni-direction wheel, mathematical model, holonomic mobile robot

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