

Nonlinear modelling and control of self-balancing human transporter

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Abstract: Various modelling and control strategies have been developing in quest for efficiently managing non-linear systems, which is majorly done by incorporating maximum possible aspects of behavior of a system into mathematical equations and then introduce control schemes to direct the influence of all the variables of such equations in a desired manner. Though some of these developed control schemes are still struggling to produce satisfying results when it comes to controlling non-linear systems, Proportional-Integral-Derivative (PID) and Linear-Quadratic- Regulator (LQR) are the two very efficient control schemes known for their stability properties and optimal control when applied to non-linear systems. Self Balancing Human Transporter (SBHT) is one such non-linear system which is widely used and needs to be effectively controlled to maintain uniform speed and dynamic stability. It is very crucial to work on both, the dynamics and efficient control of two wheel SBHT. This article will show the design and analysis of more advanced and recently developed algorithms of the above mentioned control schemes being applied on the new, more precise, fully functional and non linear simulation model of two wheel SBHT. Comparison study between the two has also been done on various parameters.

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