

A Comparative Study on a Tilt-Integral-Derivative Controller with Proportional-Integral-Derivative Controller for a Pacemaker

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Abstract : The study is done to determine the comparison between proportional-integral-derivative controller (PID controller) and tilt-integral-derivative (TID controller) for cardiac pacemaker systems, which can automatically control the heart rate to accurately track a desired preset profile. The controller offers good adaption of heart to the physiological needs of the patient. The parameters of the both controllers are tuned by particle swarm optimization (PSO) algorithm which uses the integral of time square error as a fitness function to be minimized. Simulation results are performed on the developed cardiovascular system of humans and results demonstrate that the TID controller produces superior control performance than PID controllers. In this paper, all simulations were performed in Matlab.

Keywords : integral of time square error, pacemaker systems, proportional-integral-derivative controller, PSO algorithm, tilt-integral-derivative controller

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