Diabetics blood glucose control based on GA-FOPID technique

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Abstract:

In this paper, an optimized Fractional Order Proportional, Integral, Derivative based Genetic Algorithm GA-FOPID optimization technique is proposed for glucose level normalization of diabetic patients. The insulin pump with diabetic patient system used in the simulation is the Bergman minimal model, which is used to simulate the overall system. The main purpose is to obtain the optimal controller parameters that regulate the system smoothly to the desired level using GA optimization to find the FOPID parameters. The next step is to obtain the FOPID controller parameters and the traditional PID controller parameters normally. Then, the simulation output results of using the proposed GA-FOPID controller was compared with that of using the normal FOPID and the traditional PID controllers. The comparison shows that all the three controllers can regulate the glucose level but the use of GA-FOPID controller was outperform the use of the other two controllers in terms of speed of normalization and the overshoot value.