

Comparative Study on the Controllers for Vasopressors in

Mean Arterial Pressure Control

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Abstract

Cardiovascular diseases globally contribute a major role in leading cause of death. Modern development of science and technology has contributed significantly to the advances in medical care though cardiovascular diseases are increasing adversely on the other hand. During cardiovascular surgery, the important hemodynamic parameter for the surgeon to keep track of patient's health is Mean Arterial Pressure.

Control of hemodynamic variables such as Mean Arterial Pressure (MAP) has been approached using single drug Noradrenaline by various control algorithms and compared the results with patient model obtained using single drug Dopamine in the literature [1]. This paper presents the design and implementation of the controllers such as Proportional Integral (PI), Proportional Integral Derivative (PID), Smith Predictive Controllers for the patient model which is developed by the readings obtained during Cardiovascular surgery. Implementation of these controllers is necessary to improve and automatically maintain the patient safety and minimum recurring time. The controlled Mean Arterial Pressure is compared, and time domain specifications are determined. Simulation results are obtained using MATLAB Software.

Keywords: Dopamine, MAP, Noradrenaline, PI, PID, Smith Predictor

References:

1. S. Enbiya, A. Hossain and F.Mahieddine, "Multi-drug Infusion Control Using Model Reference Adaptive Algorithm", Bradford, London, (2009).