

Causal Modeling of the Glucose-Insulin System in Type-I Diabetic Patients

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Abstract : In this paper, a simulation model of the glucose-insulin system for a patient undergoing diabetes Type 1 is developed by using a causal modeling approach under system dynamics. The OpenModelica simulation environment has been employed to build the so called causal model, while the glucose-insulin model parameters were adjusted to fit recorded mean data of a diabetic patient database. Model results under different conditions of a three-meal glucose and exogenous insulin ingestion patterns have been obtained. This simulation model can be useful to evaluate glucose-insulin performance in several circumstances, including insulin infusion algorithms in open-loop and decision support systems in closed-loop.

Keywords : causal modeling, diabetes, glucose-insulin system, diabetes, causal modeling, OpenModelica software

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