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Dynamical analysis in the mathematical modelling of human blood glucose.

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Summary: We want to apply the geometrical method to a dynamical system of human blood glucose. Due to the educational importance of model building, we show a relatively general modelling process using observational facts. Next, two models of some concrete forms are analysed in the phase plane by means of linear stability, phase portrait and vector analysis. In the minimal model, there is no periodic solution, and the time evolution proves to be an area-contracting map, which favours every solution converging to a unique fixed point. In a plausible extension of the minimal model, the number of fixed points can be changed by varying the parameters of the additional non-linear terms, i.e. a bifurcation occurs.

Classification: M65 I75

Keywords: geometrical method; mathematical modelling; medicine; human blood glucose; minimal model; non-minimal model

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