Nonlinear models of $\dot{V}O_2$ and heart rate

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30 de abril de 2007

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The kinetics of oxygen uptake ($\dot{V}O_2$) and heart rate in response to exercise is a fundamental area of medicine. Using modern tools it is possible to obtain breath by breath or beat to beat time series data for these variables. Such time series are nonlinear functions of time and exercise intensity. We present models of the heart rate [1] and oxygen uptake [2] kinetics in response to exercise. Both models [1, 2] consist of a set of coupled nonlinear ordinary differential equations, similar to those used in [3, 4, 5]. We analyze the geometry of the phase space of the models. We also show how the models can be fit to an individuals raw data hence giving important medical information.

Referencias

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