



Markov Chain for an Indicator Passing Through Cardio-Vascular System

By Viktor Kislukhin

LAP LAMBERT Academic Publishing. Paperback. Book Condition: New. Paperback. 76 pages. Dimensions: 8.7in. x 5.9in. x 0.2in. Some problems in estimation of the state of the cardio-vascular system (CVS) cannot be solved without mathematics modeling. One example would be how to separate the first pass of an indicator from the recirculation. This separation is needed in order to estimate the flow pumped by the heart during a unit of time. Another example would be to determine the cause that it takes an indicator such a long time to mix within the CVS. It is critical to know this in order to interpret the value of blood volumes. These and others problems are solved in this manuscript by viewing the CVS as an oriented closed graph and blood flow as described by the Markov matrix. A mathematical model reveals that, in the microcirculation, there are a fraction of closed microvessels that are in random exchange with open microvessels. This mechanism is responsible for the delayed mixing of an indicator, the slow removal of the metabolic waste products (including the delay in nitrogen removal in divers) and could thus be a regulator of O₂ delivery to the tissues. This manuscript is, therefore, of...



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