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Fractal thermodynamics of the states of instantaneous heart rhythm. (English)

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Russ. J. Math. Phys. 28, No. 2, 251-256 (2021).

Summary: The paper considers the concept of fractal thermodynamics for studying the states of instantaneous cardiac rhythm (ICR) according to Holter monitoring (HM) data. An effective method cardiac rhythms analysis using the quantum phase space of the ICR Sq is presented. The space Sq is a powerful tool for studying nondeterministic chaotic systems which allows to identify statistical regularities adequately covering the patients' cardiovascular system states in the context of nondeterministic chaos of ICR states [A. N. Kudnikov et al., "Kvantovanie fazovogo prostranstva mgnovennogo serdechnogo ritma" (Russian), in: V. D. Lahno (ed.), Doklady mezhdunarodnoy konferentsii "matematicheskaya biologiya i bioinformatika". Puschino: IMPB RAN (2018); the first author et al., "Visualisation of the quantum phase space of instantaneous heart rhythm", CEUR Workshop Proc. 2267, 359–363 (2018)]. The results of our papers show with high accuracy Sq is a fractal.

MSC:

92C30 Physiology (general)

28A80 Fractals

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