

Abstract Submitted
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A Gaussian theory of the response of heart frequency to ventilator YAN LU, MICHAEL DEEM, Rice University, ANTON BURYKIN, TIMOTHY BUCHMAN, Washington University School of Medicine, RICE UNIVERSITY TEAM, WASHINGTON UNIVERSITY SCHOOL OF MEDICINE TEAM — Extensive studies suggest that there exists a coupling between the human heart and respiration. We constructed a simple Gaussian Markovian propagation model to describe the influence of ventilator on patient's heart frequency. We show that for sedated patients, the theory captures the essential correlations between heart rate and induced ventilation during patient's spontaneous breathing and by so doing successfully predicts the response of heart rate to application of the ventilator. We also discuss the cases in which the theory fails, all of which were none sedated patients. We believe sedation disconnects high brain activities from cardiac and respiratory functions leaving just the primitive response.

Yan Lu
Rice University

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