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Toward adaptive control of acute inflammation

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Title: Toward adaptive control of acute inflammation

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Abstract:

When the natural processes that govern the inflammatory response to severe infection or traumatic insult become dysregulated, intervention is necessary to restore homeostasis to the host. However, knowing how to intervene in order to help guide desirable outcomes is a difficult endeavor due to the complexity of the immune response. Using a canonical and highly nonlinear mathematical model of the systemic acute inflammatory response, we investigate combining parameter and state estimation techniques within a control scheme to move toward effective adaptive control of a challenging biomedical problem. In particular, we report on combining state estimation methods with nonlinear model predictive control to determine therapeutic intervention strategies in a diverse virtual patient population with limited measurement feedback.