

1067-93-1956

Radu C Cascaval* (radu@uccs.edu), Department of Mathematics, 1420 Austin Bluffs Parkway, Colorado Springs, CO 80918. *Autoregulation Mechanisms in Complex Networks*.

The dynamic control of spatial networks presents numerous challenging problems, both theoretically and computationally. Here we present a study of the cerebral autoregulation (CA) mechanism in the cardiovascular network, in which both the heart rate (HR) variability and the peripheral resistance (PR) variability act as controls for the pressure and flow rates throughout the system, with the aim of maintaining constant flow in the brain during dynamic changes. The dynamics of the network is characterized by distinct patterns of the nonlinear pressure and flow distribution, and related inverse problems will be presented. Furthermore, we will discuss evidence that the complexity of the underlying network and the presence of different scales in the model influences the effectiveness of these control mechanisms. (Received September 22, 2010)