Self-scaling tumor growth

Jürgen Schmiegel

Thiele Centre for Applied Mathematics in Natural Science,
Aarhus University,
DK–8000 Aarhus, Denmark

Abstract

We study the statistical properties of the star-shaped approximation of in vitro tumor profiles. The emphasis is on the two-point correlation structure of the radii of the tumor as a function of time and angle. In particular, we show that spatial two-point correlators follow a cosine law. Furthermore, we observe self-scaling behaviour of two-point correlators of different orders, i.e. correlators of a given order are a power law of the correlators of some other order. This power-law dependence is similar to what has been observed for the statistics of the energy-dissipation in a turbulent flow. Based on this similarity, we provide a Lévy based model that captures the correlation structure of the radii of the star-shaped tumor profiles.