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Abstract

Entropy Production of Reaction-Diffusion Systems under Confinement †

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Diffusion processes under confinement within a channel in which one coordinate is longer than the others have been studied by projecting the diffusion equation into one dimension. This results in the so-called Fick-Jacobs equation that introduces an effective diffusion coefficient dependent on the position. Several approaches have been used to propose position-dependent diffusion coefficients, and it has been found that it depends on the channel's width function as well as the geometric properties of the midline, such as its curvature and torsion. Within this approach we study the entropy production for a reaction-diffusion process of two species on a two dimensional channel. Recently, it has been seen that the Turing instability conditions, the range of unstable modes for patterns formation, as well as the spatial structure of the patterns themselves, can be modified through the geometric parameters of the confinement. In this contribution, the effect of the confinement on entropy production is analyzed and characterized in terms of the geometry of the corresponding channel.