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Wave propagation in spatially modulated domains[1] STEFFEN MARTENS, ALEXANDER ZIEPKE, HARALD ENGEL, Technische Universität Berlin, Institut für Theoretische Physik, 10623 Berlin, Germany — Propagation of traveling wave patterns, including traveling fronts and solitary excitation pulses, in a 3D domain with spatially varying cross-section is reduced to an equivalent 1D reaction-diffusion-advection equation [S. Martens et al., PRE **91**, 022902]. Treating the boundary-induced advection term as a weak perturbation, in a second step, an equation of motion for traveling waves within confined media can be derived. Both methods predict properly the nonlinear dependence of the propagation velocity on the ratio of the modulation period of the geometry to the intrinsic width of the front, or pulse. As a main feature, we observe finite intervals of propagation failure of waves induced by the domain's modulation and derive an analytically tractable condition for their occurrence [A. Ziepke, JCP **145**, 094108]. For the highly diffusive limit, using homogenization techniques, we show that wave velocities are governed by an effective diffusion coefficient [S. Martens, JCP **145**, 016101]. Furthermore, we discuss the effects of a single bottleneck on the period of pulse trains and observe period changes by integer fractions dependent on the bottleneck width and the period of the entering pulse train; being in accordance with experimental results.

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