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Finite-difference approximations to a parabolic system modeling the thermoelastic contacts of two rods

A sequence of finite difference approximate solutions to a parabolic system, which models two dissimilar rods that may come into contact as a result of thermoelastic expansion , is studied. The approximate solutions are constructed based on a set of finite difference schemes to the system, and they are proved to converge to the exact solution. Morever, the error bound, which measures the difference between the exact solution and the approximate solutions in a reasonable norm, is derived and proved rigorously.