The conference is supported by the National Laboratory for Health Security project RRF-2.3.1-21-2022-00006

Square waves and Bykov T-points in DDEs with large delay

Mina Stöhr

Weierstrass Institute Berlin, Germany
stoehr@wias-berlin.de

Dynamical effects in DDEs with large delay have been studied extensively. They hold significance in various fields including optical and opto-electronic systems. These systems exhibit a wide range of intriguing phenomena, such as the generation of square waves and pulse solutions (temporal localized states). The study of square waves in DDE-systems date back to the early stages in the field. By formulating an equation with an advanced argument, we are able to treat square waves like temporal localized states. Using the limit of large delay, temporal localized states can be treated like homoclinic orbits in a desigularized equation. We can employ this approach that allows us to examine bifurcations of square waves supported by the framework of homoclinic bifurcation theory. We demonstrate our results by discussing the unfolding of a heteroclinic bifurcation called Bykov T-point in a model of the Kerr–Gires–Tournois interferometer, based on delay differential algebraic equations, in which square waves are generated.