

A scalar Riemann–Hilbert problem on the torus

Mateusz Piorkowski

University of Vienna

`mateusz.piorkowski@univie.ac.at`

Gerald Teschl

University of Vienna

`gerald.teschl@univie.ac.at`

In this talk we will present a case study of a scalar Riemann–Hilbert problem on the torus. This work has been motivated by the analysis of the KdV equation with steplike initial data via the nonlinear steepest descent method. It turns out that the model problem for the transition region can be naturally formulated as a scalar Riemann–Hilbert problem on the torus. This approach does not only lead to the explicit Riemann–Hilbert solutions given in terms of Jacobi theta functions, but also illuminates the uniqueness and ill-posedness issues raised in an earlier paper.