Solving inverse eigenvalue problems for totally nonnegative matrices with finite steps

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Abstract

Inverse eigenvalue problems include a problem of constructing structured matrices with prescribed eigenvalues. Construction of totally nonnegative (TN) matrices, whose minors are all nonnegative, with prescribed eigenvalues is an important topic of inverse eigenvalue problems. In this talk, it is clarfied that an inverse eigenvalue problem for TN matrices is closely related with some integrable systems, where integrable systems mean dynamical systems which have exact solutions. In particular, it is shown that TN matrices with pre- scribed eigenvalues can be constructed in finite steps with the help of discrete integrable systems such as the discrete Toda equation.