

Polynomial Tau Functions and Bilinearization of the Drinfeld–Sokolov Hierarchies

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The Drinfeld–Sokolov hierarchies are sequences of partial differential equations introduced in 1985. Each sequence of PDE's is called an integrable hierarchy and possesses a bihamiltonian structure. Moreover, one can express all the components of any solution as logarithmic derivatives of a single function called the tau function. In this talk I aim to show how to compute polynomial tau functions (the simplest ones) of the Drinfeld–Sokolov hierarchies in terms of Toeplitz determinants. Furthermore, this allows us to search for Hirota equations that could be satisfied by the computed tau functions. For instance, in the Drinfeld–Sokolov hierarchy of type B2, we showed that there is no Hirota equation of degree 2 nor 4 satisfied by the computed tau functions and only one for degree 6 and 8.

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