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KdV equation: Deift conjecture and Dubrovin Flow

In 2008, P. Deift conjectured that the solution of KdV equation with almost periodic initial data is almost periodic in time. I will discuss the proof of this conjecture in the case of the so-called Sodin-Yuditskii type initial data, i.e. the initial data for which the associated Schroedinger operator has purely absolutely continuous spectrum which satisfies certain thickness conditions. In particular, we establish the existence, uniqueness, and almost periodicity of the solutions with small analytic quasiperiodic initial data with Diophantine frequency vector. A careful analysis of the Dubrovin flow for the initial data plays a crucial role in the proof. This is a joint work with D. Damanik (Rice), M. Goldstein (Toronto) and M. Lukic (Rice).