Analytical methods for studying quantum quenches in integrable models

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I consider the non-equilibrium time evolution in integrable models after a quantum quench. For the case of a magnetic field quench in the transverse field Ising chain I present detailed results for the time evolution of local observables, which are shown to relax to a generalised Gibbs ensemble (GGE) \[2\] at late times. More generally, the reduced density matrix of a subsystem is shown to relax to a GGE in a power-law fashion in time. Dynamical response functions are studied as a function of the time after the quench and are shown to approach values given by the GGE as well. Finally generalizations to the sine-Gordon model \[3\] are discussed.