Quench Dynamics of the Anisotropic Heisenberg Model[1] WEN-SHUO LIU, NATAN ANDREI, Rutgers University — We develop an analytic approach for the study of the quench dynamics of the anisotropic Heisenberg model (XXZ model) on the infinite line. We present the exact time-dependent wavefunctions after a quench in an integral form for any initial state and for any anisotropy ? by means of a generalized Yudson contour representation. We calculate the evolution of several observables from two particular initial states: starting with a local Nèel state we calculate the time evolution of the antiferromagnetic order parameter-staggered magnetization; starting with a state with consecutive flipped spins we calculate the propagation of magnons and bound state excitations, and the induced spin currents. We also show how the "string" solution of Bethe Ansatz equations emerge naturally from the contour approach. We confront our results with experiments and numerical methods where possible.

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Date submitted: 14 Nov 2013   Electronic form version 1.4