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**S-MATRIX APPROACH TO THE NON-EQUILIBRIUM STEADY STATE
FOR THE ISING SPIN CHAIN**

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Abstract:

I will consider the problem of two Ising spin chains (Left and Right) initially prepared at thermal equilibrium but with different temperatures T_l and T_r . At $t=0$, the chains are coupled in the middle and in the long time limit a steady state is reached where a constant flux of energy is present. I will discuss the properties of the the non-equilibrium steady state density matrix and compute the flux of energy and its large deviation function. The basic tool is the S operator which intertwines between the hamiltonian of the spin chains before and after the coupling.