could be interpreted in retrospect as demonstrating the equivalence between the Ashkin-Teller model and the twisted gaussian model, although he did not note the supersymmetry at special values of the coupling. A number of workers have recently obtained similar results independently.[73]

8.2 The Ising model fermion as Nambu-Goldstino

In 70 we also showed that the fermionic soliton field of the critical Ising model ($c = 1/2$) is the Nambu-Goldstino of spontaneously broken supersymmetry in the tri-critical Ising model ($c = 7/10$).

We noted that one of the relevant trajectories leaving the $c = 7/10$ tri-critical Ising model fixed point preserves supersymmety, but that the supersymmetry could be spontaneously broken away from the fixed point, because unitarity allows no supersymmetric states of the Ramond algebra and so the Witten index is zero. Then there would be a massless fermion mode, a Nambu-Goldstino, along this trajectory and the long distance limit would be described by a nontrivial fixed point. Since the number of degrees of freedom, i.e., c, is reduced by the renormalization group[68], that long distance fixed point would have to be the unique conformal field theory with $c < 7/10$, namely the Ising fixed point. By the Ward identity for broken supersymmetry, the Nambu-Goldstino is noninteracting at long distance and thus becomes the free fermion of the Ising model. It is known from analysis of the lattice versions of these models that there is such a flow to an Ising fixed point, and so supersymmetry must be spontaneously broken. This is a striking example of how supersymmetry puts rigid constraints on the global topology of the renormalization group flow.

8.3 Super Riemann surfaces and super moduli space

In the fall of 1985, *Friedan*[57] gave the mathematical definition of super Riemann surfaces and described their basic properties and some of the basic