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The rigorous construction of the 1D Extended Hubbard model by RG techniques

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In the last twenty years, many people in Rome have studied various types of Fermion models, by applying rigorous RG techniques. One of these people was Pierluigi Falco and the paper I will speak about, written in collaboration with Vieri Mastropietro and myself, was his last one.

The line of research on rigorous RG was open at the end of the 80's by Giovanni Gallavotti, who published on JSP in 1990, in collaboration with myself, a paper on the weakly interacting Fermi gas in one and three dimensions.

In this talk I will give, without too many technical details, a review of the results that have been obtained in the case of the one dimensional extended Hubbard model (a gas of fermions of spin 1/2 on the one dimensional lattice) at weak coupling and generic repulsive short range interaction.

These results concern the existence of the zero temperature limit of the Grand Canonical Ensemble, the Borel summability of perturbation theory and some universal relations satisfied by some critical indices and certain thermodynamical quantities (all depending on the coupling and all other details of the model).

These universal relations were conjectured many years ago in the physical literature, but were checked only in some special solvable spinless fermion models.

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