Introduction to the Renormalization Group

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Abstract: Renormalization Group theory was originally developed to understand the problem of singularities in quantum field theories of elementary particle physics.
Subsequently it lead to the explanation of universality in the physics of phase transitions where it grew into a powerful method to study scale invariant problems occurring in noisy systems, dynamical systems, non-equilibrium systems and many other fields.
The course will give an introduction to the basic concepts of the theory in the context of equilibrium statistical mechanics and quantum field theory and time permitting in non-equilibrium problems. It will also serve as an introduction to the 2nd week course by Mastropietro.