1. Record Nr. UNINA9910478891903321

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Titolo	On mesoscopic equilibrium for linear statistics in Dyson's Brownian motion / / Maurice Duits, Kurt Johansson
Pubbl/distr/stampa	Providence, Rhode Island : , : American Mathematical Society, , [2018] ©2018
ISBN	1-4704-4821-1
Descrizione fisica	1 online resource (130 pages)
Collana	Memoirs of the American Mathematical Society ; ; Volume 255, Number 1222
Disciplina	519.2/33
Soggetti	Stochastic processes Stochastic differential equations Mesoscopic phenomena (Physics) Brownian motion processes Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Cover -- Title page -- Chapter 1. Introduction -- Chapter 2. Statement of results -- 2.1. Assumptions on -- 2.2. Deterministic initial points -- 2.3. Concentration inequalities -- 2.4. Random initial points -- 2.5. Further remarks -- 2.6. Overview of the rest of the paper -- Chapter 3. Proof of Theorem 2.1 -- 3.1. Determinantal strucure -- 3.2. Asymptotic results for _{ } and _{ }^{ } -- 3.3. Proof of Theorem 2.1 -- Chapter 4. Proof of Theorem 2.3 -- 4.1. Overview of the proof -- 4.2. The loop equations -- 4.3. Loop equations on the mesoscopic scale -- 4.4. Proof of Theorem 2.3 -- Chapter 5. Asymptotic analysis of _{ } and _{ } -- 5.1. Integrable form of _{ } -- 5.2. The functions -- 5.3. Saddle points -- 5.4. Deforming the contours -- 5.5. Asymptotics for and -- 5.6. Proof of Lemma 3.2 -- 5.7. Asymptotics for _{ }(,) -- 5.8. Asymptotics for ^{ }_{ } -- Chapter 6. Proof of Proposition 2.4 -- 6.1. Preliminaries -- 6.2. A first concentration inequality -- 6.3. Proof of Poposition 6.2 -- 6.4. A concentration inequality using the logaritmic Sobolev inequality -- 6.5. Proof of Proposition 2.4 -- 6.6. One more concentration inequality --

Sommario/riassunto

In this paper the authors study mesoscopic fluctuations for Dyson's Brownian motion with \beta =2. Dyson showed that the Gaussian Unitary Ensemble (GUE) is the invariant measure for this stochastic evolution and conjectured that, when starting from a generic configuration of initial points, the time that is needed for the GUE statistics to become dominant depends on the scale we look at: The microscopic correlations arrive at the equilibrium regime sooner than the macrosopic correlations. The authors investigate the transition on the intermediate, i.e. mesoscopic, scales. The time scales that they consider are such that the system is already in microscopic equilibrium (sine-universality for the local correlations), but have not yet reached equilibrium at the macrosopic scale. The authors describe the transition to equilibrium on all mesoscopic scales by means of Central Limit Theorems for linear statistics with sufficiently smooth test functions. They consider two situations: deterministic initial points and randomly chosen initial points. In the random situation, they obtain a transition from the classical Central Limit Theorem for independent random variables to the one for the GUE.