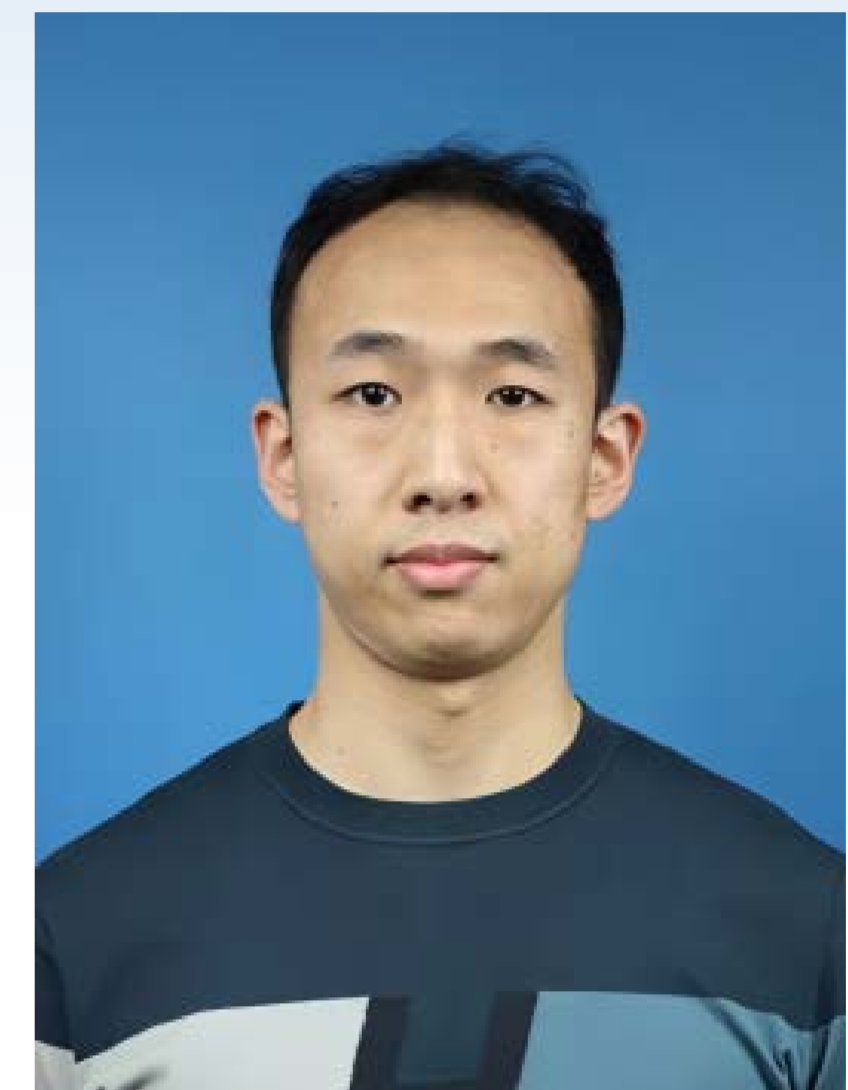




A quadratic BSDE approach to normalization for the finite volume 2D sine-Gordon model in the finite ultraviolet regime

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徐润东博士2023年6月毕业于山东大学金融研究院，师从嵇少林教授。同年7月进入复旦大学数学科学学院从事博士后研究至今，合作导师为汤善健教授。他的研究方向为随机最优控制理论、正倒向随机微分方程及其应用、数学物理模型中的概率方法。目前在SIAM. J. Optim. Control, ESAIM Control Optim. Calc. Var.等期刊上发表论文3篇。获得中国博士后科学基金第76批面上资助、上海市“超级博士后”激励计划资助等。



Abstract: In this presentation, we discuss a new construction of the 2D sine-Gordon model on bounded domains by a novel normalization technique in the finite ultraviolet regime. Our methodology involves a family of backward stochastic differential equations (BSDEs) driven by a cylindrical Wiener process, whose generators are purely quadratic functions of the second unknown variable. The terminal conditions of the quadratic BSDEs are uniformly bounded and converge in probability to the real part of complex multiplicative chaos tested against an arbitrarily given test function, which helps us describe our sine-Gordon measure through some delicate estimates concerning bounded mean oscillation (BMO) martingales. As the ultraviolet cutoffs are vanishing, the quadratic BSDEs converge to a quadratic BSDE that completely characterizes the absolute continuity of our sine-Gordon measure with respect to the law of Gaussian free fields. Our approach can also be used effectively to establish the connection between our sine-Gordon measure and the scaling limit of correlation functions of the critical planar XOR-Ising model and to prove the weak convergence of the normalized charge distributions of 2D log-gases.

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会议地点: ZOOM会议室会议ID: 3541437366 密码: 123456

主办单位:

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