Cores of Dirichlet forms related to
Random Matrix Theory

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We prove the sets of polynomials on configuration spaces are cores of
Dirichlet forms describing interacting Brownian motions in infinite dimen-
sions. Typical examples of these stochastic dynamics are Dyson’s Brownian
motion and Airy interacting Brownian motion. Both particle systems have
logarithmic interaction potentials, and naturally arise from random matrix
theory.

The results above are used to prove the identity of the infinite-dimensional
stochastic dynamics related to the random matrix theories constructed by
apparently different methods: the method of space-time correlation functions
and that of stochastic analysis.

We also use these results to prove the identity of Dirichlet forms de-
scribing the solutions of infinite-dimensional stochastic differential equations
constructed by Lang and Osada. These solutions are limits of finite particle
systems endowed with different boundary conditions.

References

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