

**ORTHONORMAL THETA FUNCTIONS ASSOCIATED  
WITH AFFINE ROOT SYSTEMS AND  
DETERMINANTAL POINT PROCESSES**

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ABSTRACT

Associated with the seven families of irreducible reduced affine root systems  $R$ , Rosengren and Schlosser introduced the families of  $R$ -theta functions. We consider appropriate inner products and construct the orthonormal bases for the Hilbert spaces of  $R$ -theta functions. Using them the reproducing kernels are defined and the families of determinantal point processes (DPPs) with finite numbers of particles are obtained on a complex plane. There the correlation kernels are given by the reproducing kernels. The double periodicity and symmetry of the DPPs are studied. Infinite particle limits provide the Ginibre DPP well studied in random matrix theory as well as new kinds of infinite DPPs.

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