Products of random matrices

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I will present an overview of recent work on singular values of products of complex Ginibre random matrices. This development started with the work of Akemann, Ipsen, Kieburg and Wei in 2013 who showed that the squared singular values are a determinantal point process with correlation kernel that can be expressed in terms of Meijer $G$-functions. This was extended to products with inverses of complex Ginibre matrices and to products with truncated unitary matrices.

The correlation kernels have explicitly computable scaling limits as the sizes of the matrices tend to infinity. One finds the familiar sine kernel in the bulk and the Airy kernel at the soft edge of the limiting spectrum. At 0, which is a hard edge, there is a new family of limiting that are again expressible in terms of Meijer $G$-function. These Meijer $G$-kernels are universal and they also appear in biorthogonal ensembles and in multi-matrix models.

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