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Completely Monotonic Fredholm Determinants

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Abstract

The probability of having m eigenvalues of a random Hermitian matrix in an interval is a multiple of $(-1)^m$ times the m th derivative of a Fredholm determinant at $\lambda = 1$. We extend this result to infinite dimensions by studying the completely monotonicity of some special functions which arise as Fredholm determinants of compact self-adjoint operators on Hilbert spaces. The relation with total positivity will be also explained.