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*What are the eigenvalues of the sum of two Hermitian matrices? A quantum information inspired answer.*

The purpose of this talk is to bring the excitement of free analysis into applications. Consider  $\text{eig}(A+B)$  and the connection to  $\text{eig}(A)$  and  $\text{eig}(B)$ . Free probability tells us mathematically about the infinite  $n$  limit under certain circumstances. We describe how joint work with Ramis Movassagh on a quantum information problem has shown us from an applied point of view that one can use the results of free probability in contexts far wider than current mathematics suggest. This talk should be suitable both for experts and those not familiar with free probability. (Received September 21, 2011)