"Averages and asymptotics of automorphic L-functions over families"

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We give a recipe for producing spectral identities for weighted averages of automorphic L-functions in families, and extract asymptotics with error terms.

For example, for GL(2) over number fields, we can break convexity in the t-aspect, via a family of identities originating with Good in the 1980’s.

One broad family of identities for L-functions arises from equating two different spectral decompositions of deformations of automorphic distributions, one along a Euler/Gelfand subgroup to obtain an average of periods and L-functions, the other estimated via Sarnak-Bernstein-Reznikoff-Krotz-Stanton on integrals of products of eigenfunctions.

For example, this recipe produces averages of: GL(n-1) twists of cuspforms on GL(n), Rankin-Selberg convolutions for GL(n), doubling-integral Rankin-Selberg L-functions on classical groups, and triple product L-functions. (Received September 19, 2007)