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Second moment formulas for Rankin-Selberg convolutions and character  
twists of  $GL(2)$  L-series

I'll describe recent joint work with Min Lee in which we apply the meromorphic properties of shifted multiple Dirichlet series to certain second moment problems. One application is to second moments of Rankin-Selberg convolutions averaged over the spectrum, essentially a generalization of some fourth moment estimates of Ivic and Motohashi. Another application is to the problem of expressing the mean square of  $GL(2)$  L-series averaged over characters as a main term plus an error term.