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Rankin-Selberg convolutions for $SO_{2\ell+1} \times GL_n$: Local theory. (English) Zbl 0805.22007
Mem. Am. Math. Soc. 500, 100 p. (1993).

From the author's introduction: "In this paper we develop the basic local theory for certain Rankin-Selberg convolutions for generic representations of $SO_{2\ell+1} \times GL_n$, which interpolate the standard L -function of degree $2\ell n$. The cases $\ell = n, n - 1$ were studied by *S. Gelbart* and *I. Piatetski-Shapiro* [Lect. Notes Math. 1254, 53-152 (1987; Zbl 0612.10022)], where they get the Euler product, do the unramified computation and prove the existence of local gamma factors. The case $\ell \geq n$ was studied by *D. Ginzburg* [J. Reine Angew. Math. 405, 156-180 (1990; Zbl 0684.22009)], where he gets the Euler product and the unramified computation; the global construction of the Rankin-Selberg convolution for the case $\ell < n$ is based on his ideas. We will sketch this construction shortly and also recall Ginzburg's construction.

Our aim in this paper is to develop the basic corresponding local theory in the case $\ell < n$ and complete it in the remaining cases. More precisely, we establish the absolute convergence of the local integrals in a right half plane, we prove that these are rational functions in q^{-s} , over a nonarchimedean field of residual characteristic q . In the case $\ell \geq n - 1$, and an archimedean field, we can prove their meromorphic continuation to the whole plane. We show that the integrals can be made to be holomorphic and nonzero. We prove the existence of local gamma and L -factors in the nonarchimedean case. We can prove the multiplicativity of the gamma factors in all the above cases in the nonarchimedean case. The proof is very long and technical. In this paper we prove multiplicativity of gamma in the first variable (the representation of $SO_{2\ell+1}$) and in case $\ell < n$. The technique and ideas used here are very much inspired by (and oftentimes are identical to) those of *H. Jacquet*, *I. Piatetski-Shapiro* and *J. Shalika* [cf. Am. J. Math. 105, 367-464 (1983; Zbl 0525.22018)]. As an application of a particular case of the above multiplicativity, we obtain the unramified computation in case $\ell < n$."

Reviewer's note: In a subsequent work ["On the Archimedean theory of Rankin-Selberg convolutions for $SO_{2\ell+1} \times GL_n$ " (to appear)] the author has extended all the meromorphic continuation, functional equation and multiplicativity results of the present paper to the archimedean case.

Reviewer: [S.Gelbart \(Rehovot\)](#)

MSC:

[22E50](#) Representations of Lie and linear algebraic groups over local fields
[11F70](#) Representation-theoretic methods; automorphic representations over local and global fields

Cited in **3** Reviews
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Keywords:

[Rankin-Selberg convolutions](#); [generic representations](#); [Euler product](#); [local gamma factors](#); [nonarchimedean field](#); [L-factors](#); [multiplicativity](#); [meromorphic continuation](#)

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