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An approximate form of Artin's holomorphy conjecture and nonvanishing of Artin L-functions

Let k be a number field and G be a finite group, and let \mathfrak{F}_k^G be a family of number fields K such that K/k is normal with Galois group isomorphic to G . Together with Robert Lemke Oliver and Jesse Thorner, we prove for many families that for almost all $K \in \mathfrak{F}_k^G$, all of the L -functions associated to Artin representations whose kernel does not contain a fixed normal subgroup are holomorphic and non-vanishing in a wide region.

I will discuss these results and some of their arithmetic applications. For example, we prove a strong effective prime ideal theorem that holds for almost all fields in several natural large degree families, including the family of degree n S_n -extensions for any $n \geq 2$ and the family of prime degree p extensions (with any Galois structure) for any prime $p \geq 2$. Other applications relate to bounds on ℓ -torsion subgroups of class groups, the extremal order of class numbers, and the subconvexity problem for Dedekind zeta functions.