On the non-vanishing of certain Dirichlet series

Sandro Bettin

Given $k \in \mathbb{N}$, we study the vanishing of the Dirichlet series $\sum_{n\geq 1} d_k(n)f(n)n^{-s}$ at the point $s = 1$, where f is a periodic function modulo a prime p. The case $k = 1$ was considered by Chowla and by Baker, Birch and Wirsing; we extend their work to the case $k > 1$. This work is joint with Bruno Martin.

References

[1] Sarvadaman Chowla, *The nonexistence of nontrivial linear relations between the roots of a certain irreducible equation*, J. Number Theory **2**, 120-123, 1970.

[2] Alan Baker, Brian J. Birch, and Eduard A. Wirsing, *On a problem of Chowla*, J. Number Theory **5**, 224-236, 1973.

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Dipartimento di Matematica
Università di Genova