SELBERG'S CENTRAL LIMIT THEOREM OVER FUNCTION FIELDS

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Abstract: In this talk, I shall speak about the logarithm of the central value $L\left(\frac{1}{2}, \chi_D\right)$ in the symplectic family of Dirichlet L-functions associated with the hyperelliptic curve of genus g over a fixed finite field $\mathbb{F}_q$ in the limit as $g \to \infty$. Unconditionally, we will see that the distribution of $\log|L\left(\frac{1}{2}, \chi_D\right)|$ is asymptotically bounded above by the full Gaussian distribution of mean $\frac{1}{2}\log\deg(D)$ and variance $\log\deg(D)$. Additionally, the distribution of $\log|L\left(\frac{1}{2}, \chi_D\right)|$ is at least 94.27% Gaussian distributed with the same mean and variance. Assuming a mild condition on the distribution of the low-lying zeros in this family, the full Gaussian distribution is obtained.

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