

Gurevich: The Geometric Weil Representation

February-24-10
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The Weil Representation (1964)

$$\rho: SL_2(\mathbb{F}_q) \longrightarrow GL(\mathcal{C}(\mathbb{F}_q))$$

with $\rho\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} =$ the discrete Fourier transform

My comment: A good proof not only proves the theorem, it is also manifestly the simplest way to prove the theorem.