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A characterization of arithmetic equivalence via Galois representations

Let K be a number field and let $\zeta_K(s) = \sum_{n=0}^{\infty} \frac{a_n(K)}{n^s}$ be its Dedekind zeta function. Motivated by Tate's isogeny theorem we show that $\zeta_K(s)$ is completely determined by $a_\ell(K)$ for ℓ prime, and we show how these ideas could lead to new results on arithmetic equivalence.