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Generalised Hecke eigenvectors

If M is a module over a Hecke algebra and $v \in M$ is a simultaneous eigenvector for the Hecke operators, a *generalised eigenvector* attached to v is an element $v' \in M$ satisfying

$$T_\ell v' = a_\ell v' + a'_\ell v.$$

The scalars a'_ℓ often carry rich arithmetic information. When M is the space of forms of weight one, they are logarithms of algebraic numbers and are a key to explicit class field theory for real quadratic fields. I will discuss the case where M is a space of modular forms of weight two with fourier coefficients in $\mathbb{Z}/p\mathbb{Z}$, where these quantities appear to be related to classes in K -theory considered by Beilinson and Flach.

This is an account of work in progress with Alice Pozzi.