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Dual pairs of eta quotients

The Dedekind eta function is defined by the infinite product

$$\eta(z) = e^{\pi \mathrm{i} z/12} \prod_{n=1}^{\infty} (1 - e^{2\pi \mathrm{i} n z}).$$

An eta quotient of level N is a function of the form

$$f(z) = \prod_{t|N} \eta^{r_t}(tz),$$

where the exponents r_t are integers. We call a pair (f, g) of eta quotients a dual pair if the derivative of f is a constant multiple of g. In this talk, we determine the dual pairs of eta quotients of prime power levels. We achieve this by finding upper bounds for orders of zeros (at cusps) of a class of Eisenstein series of weight 2 and prime power level. This is joint work with Zafer Selcuk Aygin (American University of Sharjah).