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On q-analogs of Wolstenholme's theorem for multiple q-harmonic sums

Congruences for ordinary single and multiple harmonic sums have been studied since the nineteenth century. It is well known that many multiple harmonic sums modulo a prime or a power of a prime can be expressed in terms of Bernoulli numbers. The situation with q-analogs is much less known. The first q-congruences for q-analogs of harmonic numbers, namely the q-analogs of Wolstenholme's theorem, were obtained by Andrews. In 2008, Dilcher showed that the higher order (depth 1) q-harmonic numbers are related to the so-called degenerate Bernoulli numbers. In this talk, we will discuss further q-extensions of the Wolstenholme theorem to multiple q-harmonic sums (strict and non-strict versions) of arbitrary depth on strings of one-two-three indices. This is joint work with Kh. Hessami Pilehrood and R. Tauraso.