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Linear feedback shift registers and covering arrays

The set of fixed length subintervals of a linear feedback shift register form a linear code. A very nice theorem of Bose from 1961 proves that these codewords form the rows of a covering array of strength t if and only if the dual linear code has minimum weight $t+1$. Munemasa observed that whenever the length of the intervals is less than a generous bound, the dual code is the Hamming code which has minimum distance 3 and this the covering array is guaranteed to have strength 2. In fact the only 3-coverage that is missing corresponds to the weight-3 multiples of the generating polynomial of the LFSR. We use this and results on difference sets over finite fields to construct a new famlily of strength 3 covering arrays which improve many best known upper bounds on covering arrays