Mutually orthogonal binary frequency squares

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A *binary frequency square* is a square $(0,1)$-matrix in which each row and column has the same number of zeroes in it. If each row and column has t ones and $n-t$ zeroes then we say the square has frequencies $(n-t,t)$. Two binary frequency squares F_1 and F_2 with frequencies (λ_0,λ_1) and (μ_0,μ_1) are *orthogonal* if for each $\ell,m\in\{0,1\}$ there are $\lambda_\ell\mu_m$ ordered pairs (i,j) such that $(F_1[i,j],F_2[i,j])=(\ell,m)$.

In this talk I will survey some old and many new results on sets of mutually orthogonal binary frequency squares. Of particular interest will be sets that are *maximal* in that they cannot be extended to a larger set whilst preserving orthogonality. Some tools for diagnosing maximality have recently been developed.