MIEKO YAMADA, Kanazawa University, Kakuma-machi, Kanazawa 920-1192, Japan
Self-dual $\mathbf{Z}_4$ codes generated by Hadamard matrices and conference matices

Active researches on self-dual codes over $\mathbf{Z}_4 = \mathbf{Z}/4\mathbf{Z}$ have been devoted in recent years. A Type II $\mathbf{Z}_4$-code is a self-dual code which has the property that all Euclidean weights are divisible by 8 and contains the all-one vector.

A self-dual $\mathbf{Z}_4$-code which is not a Type II code is called a Type I $\mathbf{Z}_4$-code. A Type IV $\mathbf{Z}_4$-code is a self-dual code with all codewords of even Hamming weight. A type IV code which is also Type I or Type II is called a Type IV-I, or a Type IV-II code respectively. Two infinite families of Type IV codes are known, Klemm's codes and $C_{m,r}$ codes.

The distinct rows of an Hadamard matrix are orthogonal. If we recognize the components 1 and -1 of an Hadamard matrix H_{4m} of order $4m$ as the elements of $\mathbf{Z}_4$, then the $\mathbf{Z}_4$-code generated by H_{4m} is self-orthogonal. In 1999, Charnes proved that if an Hadamard matrix H_{4m} has order $4m$ and m is odd, then the $\mathbf{Z}_4$-code generated by H_{4m} is self-dual and equivalent to Klemm's code. Charnes and Seberry considered the $\mathbf{Z}_4$-code generated by a weighing marix $W(n,4)$ and proved that if it has type $4^{(n-4)/2}2^4$, then it is a self-dual code. In this talk, we give families of self-dual $\mathbf{Z}_4$-codes of Type IV-I and Type IV-II generated by Hadamard matrices and conference matrices.