”*k*-uniform self-complementary hypergraphs”

A *k*-uniform hypergraph $H = (V ;E)$ is called self-complementary if there is a permutation $\sigma : V \rightarrow V$, called self-complementing, such that for every *k*-subset *e* of V, *e* is in E if and only if $\sigma(e)$ is not in E.

Self-complementing permutations are one of the most useful tools in study of self-complementary structures. There are well known results for self-complementing permutations of graphs, given independently in the years 1962-1963 by Sachs and Ringel, as well as some partial results for hypergraphs given by Kocay for *k=3* (1992), by Szymański for *k=4* (2004) and Zwonek for general (not uniform) hypergraphs (2004).

We will give a general characterization of self-complementing permutations of *k*-uniform self-complementary hypergraphs of order *n,* for every *k*, $0<k<n$.
Moreover for every fixed *k* we will give straightforward method to obtain necessary and sufficient condition for *n* to be an order of a *k*-uniform self-complementary hypergraph.