The es-Splitting operation for matroids representable over prime fields $GF(p)$

P. P. Malavadkar*, School of Mathematics and Statistics, MIT World Peace University, Pune-411038 (India)
M. M. Shikare and B. N. Waphare, Department of Mathematics Savitribai Phule Pune University, Pune-411007 (India)

The es-splitting operation for binary matroids is a natural generalization of Slater's n-line splitting operation on graphs. The present paper generalizes the notion of *n-line splitting operation* on graphs to matroids representable over prime fields $GF(p)$. On a given matroid representable over $GF(p)$, this operation yields a matroid that is representable over $GF(p)$. We characterize the circuits, bases and hyperplanes of the resulting matroid in terms of the circuits, bases and hyperplanes of the original matroid M, respectively. We also explore the effect of this operation on Eulerian, bipartite and connected matroids which are representable over $GF(p)$. This operation, in general, may not preserve the connectedness of the given matroid. We provide a necessary and sufficient condition for this operation to preserve the connectedness of a given matroid that is representable over $GF(p)$.

Keywords: binary matroid, *es*-splitting operation, Eulerian matroid, bipartite matroid, connectivity