

Based on the efficient generalized water-filling with group peak power constraints (GWFGP), this paper proposes an iterative algorithm to compute the optimal solutions to system throughput (sum-rate) maximization problems. This class of problems is equipped with the multiuser multiple input multiple output multiple access channels (MU-MIMO MAC) in the general communication systems. The proposed iterative GWFGP algorithm (IGWFGP) has two levels of loops. The inner loop aims at computing the solution to each member in the family, while the outer loop aims at computing the solution to the target problem based on the results obtained by the inner loop. Both GWFGP and the convergence theory of an algorithm are used in the inner loop and the outer loop respectively. Furthermore, by exploiting the concept of variable weighting factor for covariance update, IGWFGP owns fast convergence and provides optimal solutions to the sum rate maximization problems. The usage of the convergence theory in IGWFGP and the algorithm of GWFGP are efficient and novel. To the best of the authors' knowledge, no prior algorithm has been reported in the open literature to solve the targeted problem in this paper. In addition, the proposed algorithm does not require to choose the initial value for computation. This feature is a significant advantage of the algorithm, especially for large and complicated systems.