This thesis describes the theory of multivariate rank tests based on center-outward ranks and signs. The definition of the center-outward ranks and signs is based on the measure transportation problem and depends highly on the chosen underlying grid. Several ways to generate such grids are suggested. Center-outward ranks and signs are then used to construct various test statistics for one-sample testing of location. The main contribution of the work is the introduction of new variants of the one-sample test of location. The proposed test statistics are based on randomized signs and added zero with the usage of the permutation tests for obtaining p-values. The tests are constructed under the assumption of both central or angular symmetry of the underlying distribution. In the end, a simulation study is performed to illustrate the performance of the proposed tests under different settings for several alternatives.