The study deals with the theory of interior capacities of condensers in a locally compact Hausdorff space, a condenser being treated here as a countable, locally finite collection of arbitrary sets with the sign +1 or −1 prescribed such that the closures of opposite-signed sets are mutually disjoint. We are motivated by the fact, discovered recently, that in the noncompact case the main minimum-problem of the theory is in general unsolvable and this occurs even under very natural assumptions (e.g., for the Newtonian, Green, or Riesz kernels in $\mathbb{R}^n$, $n \geq 2$, and closed condensers of finitely many plates); compare with [F]. Necessary and sufficient conditions for the problem to be solvable were given in [Z1, Z2].

Therefore it was particularly interesting to find statements of variational problems dual to the main minimum-problem of the theory of interior capacities of condensers (and hence providing some new equivalent definitions of the capacity), but now always solvable (e.g., even for nonclosed, unbounded condensers of infinitely many plates).

For all positive definite kernels satisfying B. Fuglede’s condition of consistency between the strong and weak* topologies, problems with the desired properties have been posed and solved (see [Z3]–[Z5]).

Their solutions provide a natural generalization of the well-known notion of interior equilibrium measure associated with a set. We give a description of those solutions, establish statements on their uniqueness and continuity, and point out their characteristic properties (see [Z4, Z5]).
References


