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**On the Solvability of the Gauss Variational Problem**

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**Abstract.** The work deals with the well-known Gauss variational problem considered over certain rather general classes of signed Radon measures on a locally compact space. In the compact case, sufficient conditions for the solvability of that problem were obtained by M. Ohtsuka. We show that, in contrast to the compact case, in the non-compact case the Gauss variational problem is in general non-solvable, and give a criterion (necessary and sufficient conditions) for the problem to be solvable. The results obtained are also specified for the Newtonian, Green, and Riesz kernels in  $\mathbb{R}^n$ .

**Keywords.** Radon measure, potential, external field, minimum energy problem.

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