

Development of methods for solving problems of electrostatics and thermal conductivity of plane-layered media

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The method of reflections is formulated and proved for a point charge located next to a flat-layered medium located on a dielectric half-space. The method is generalized to the case of an arbitrary system of charges and is used to solve mathematically similar problems of electrostatics and stationary thermal conductivity of plane-layered media. The application of the method to the problems of finding the distributions of the electrostatic potential in the vicinity of an elongated metal ellipsoid and a metal body of revolution of a complex shape, located near a plane-layered structure consisting of a single dielectric film located on a dielectric half-space, is considered. It is shown how to apply the results obtained for electrostatic problems to similar problems of finding the temperature distribution of uniformly heated bodies of the same geometry located near a heat-conducting plane-layered structure located on a heat-conducting half-space.

Key words: plane layered medium, mirror reflection method, electrostatics, thermal conductivity.

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