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Nonuniqueness for some linear oblique derivative problems for elliptic equations

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Abstract: It is well-known that the “standard” oblique derivative problem, $\Delta u = 0$ in Ω , $\partial u / \partial \nu - u = 0$ on $\partial\Omega$ (ν is the unit inner normal) has a unique solution even when the boundary condition is not assumed to hold on the entire boundary. When the boundary condition is modified to satisfy an obliqueness condition, the behavior at a single boundary point can change the uniqueness result. We give two simple examples to demonstrate what can happen.

Keywords: elliptic equations, uniqueness, a priori estimates, linear problems, boundary value problems

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