

# *Inequalities for Eigenvalues of Membranes and Plates\**

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**Introduction.** In the first section of this paper we shall obtain relationships involving the eigenvalues of a membrane fixed on a given boundary and those of a membrane with vanishing normal derivative on the boundary. In the second section we shall prove a conjecture of A. WEINSTEIN which relates certain membrane eigenvalues with those of the buckling problem for a clamped plate of the same shape.

In the first section,  $\mathfrak{D}$  is assumed to be a closed convex domain with boundary  $C$  in the  $xy$ -plane, and  $u(x, y)$  and  $v(x, y)$  satisfy the differential equations

$$(1a) \quad \Delta u + \lambda u = 0$$

$$(1b) \quad \Delta v + \mu v = 0$$

in  $\mathfrak{D}$ . We are concerned with the two different boundary conditions

$$(2) \quad u = 0 \quad \text{on } C,$$

and

$$(3) \quad \frac{\partial u}{\partial \nu} = 0 \quad \text{on } C,$$

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