

## ABSTRACT

A voting system is described that was designed for a professional association to ensure the equitable representation of different interests on its governing board. Approval voting, whereby voters can vote for as many candidates as they approve of, or find acceptable, was combined with constraints on the numbers that can be elected from different categories of members. These categories were defined by region and specialty and are illustrated by a  $2 \times 3$  matrix.

The representation problem is how to assign representatives, each with one vote, to the different categories so as to approximate as closely as possible target election figures (TEFs), which give the precise numbers of seats to which each category is entitled. Allocations that are consistent (larger TEFs receive at least as many seats as smaller TEFs), or--more stringently--are based on the Hamilton method of apportionment are shown not always to produce "controlled roundings," which always exist but are not in general unique. Constrained approval voting (CAV) is a method for choosing one from the set of controlled roundings--or, possibly, from a larger set of outcomes based on looser criteria--that is most approved of by all voters, subject to the constraints.

CAV received serious consideration but was not adopted because it violated the unitary philosophy of the association--that its members should view it as a single entity. Nevertheless, the analysis not only provided an understanding of CAV's possible practical effects but also cast new light, in a specific context, on fundamental issues in the theory of representation.