Title: **Apportionment of Seats in Proportional Representation Systems: A Majorization Comparison of Divisor Methods**

Author(s): **Albert W. Marshall, Ingram Olkin, Friedrich Pukelsheim**

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Summary:

Proportional representation is applied to such problems as the apportionment of a number of seats to each party proportionally to the number of votes received, or the apportionment of a number of seats to each constituency proportionally to its population. From the inception of the proportional representation movement it has been an issue whether larger parties are favored at the cost of smaller parties in one apportionment of seats as compared to another apportionment. A number of methods have been proposed and used in countries with a proportional representation system. These methods exhibit regularity of order that captures the preferential treatment of larger versus smaller parties. This order, namely majorization, permits the comparison of eat allocation in two apportionments. For divisor methods, we show that one method is majorized by another method if and only if their signpost ratios are increasing. This criterion is satisfied for the divisor methods with power mean rounding, and the divisor methods with stationary rounding. Majorization places the five traditional apportionment methods in the order as they are known to favor larger parties over smaller parties: Adams, Dean, Hill, Webster, and Jefferson.