(b) The first apportionment plan was authored by Alexander Hamilton and uses only the proportional value and rounds down to get full persons (it ignores the remainders from fractions), and any remaining seats are allocated by the size of the remainders to give $(10, 8, 8, 5, 6, 6, 5, 5, 4, 3, 3, 1, 1)$ in the order above. Relatively speaking, does the Hamilton plan favor or hurt large states? Make a graph of the differences.

(c) Show by way of a graph the increasing proportion of House representation that a single state obtains as it grows from the smallest to the largest in relative population.

1.27 The Nachmias–Rosenbloom Measure of Variation (MV) indicates how many heterogeneous intergroup relationships are evident from the full set of those mathematically possible given the population. Specifically it is described in terms of the "frequency" (their original language) of observed subgroups in the full group of interest. Call f_i the frequency or proportion of the ith subgroup and n the number of these groups. The index is created by

$$MV = \frac{\text{"each frequency} \times \text{all others, summed"}}{\text{"number of combinations"} \times \text{"mean frequency squared"}}$$

$$= \frac{\sum_{i=1}^{n}(f_i \neq f_j)f_i f_j}{\frac{n(n-1)}{2}\bar{f}^2}.$$

Nachmias and Rosenbloom (1973) use this measure to make claims about how integrated U.S. federal agencies are with regard to race. For a population of 24 individuals:

(a) What mixture of two groups (say blacks and whites) gives the maximum possible MV? Calculate this value.

(b) What mixture of two groups (say blacks and whites) gives the minimum possible MV but still has both groups represented? Calculate this value as well.