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Collapsed Symmetry Model and its Decomposition for Multi-way Tables with Ordered Categories

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Abstract: For $r \times r$ tables with ordered categories, Tomizawa (1995) considered the collapsed symmetry model. This model indicates the structure of symmetry for the $r-1$ ways of collapsing the $r \times r$ table into a 2×2 table by choosing cut points after the u-th row and after the u-th column for $u=1,...,r-1$. This paper proposes a collapsed symmetry (C) model for multi-way tables with ordered categories. The proposed model is an extension of the complete symmetry model and a special case of the marginal homogeneity (M) model. Also for multi-way tables, this paper proposes the collapsed quasi-symmetry (CQS) model which is an extension of the C model, and gives a theorem that the C model holds if and only if both the CQS and M models hold. An example is given.

Key words: Collapsed quasi-symmetry, collapsed symmetry, decomposition, marginal homogeneity, multi-way tables, ordered category, quasi-symmetry, symmetry

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To cite this article:

Kouji Tahata and Akira Takazawa; "Collapsed Symmetry Model and its Decomposition for Multi-way Tables with Ordered Categories", *JOURNAL OF THE JAPAN STATISTICAL SOCIETY*, Vol. **38**, pp.325-334 (2008) .