

Speed, T. P.

What is an analysis of variance? (English) [Zbl 0637.62070](#)
Ann. Stat. 15, 885-941 (1987).

The analysis of variance is usually regarded as being concerned with sums of squares of numbers and independent quadratic forms of random variables. In this paper, an alternative interpretation is discussed. The author regards ANOVA as a property of certain special classes of dispersion models for arrays of random variables, or vectors, namely, for certain models defined by equality constraints, amongst (co)variances. There should be an appropriate real spectral decomposition for all the dispersion matrices in the model, and a corresponding orthogonal decomposition for elements of the array. The components in these decompositions have interpretations which range from the notion of main effects and interactions, in classical ANOVA, through to harmonics at different wavelengths, wave numbers etc., in the more classical harmonic analyses. For finite arrays there are also decompositions of sums of squares.

In the conclusion section what the author believes is that his definition is a mathematically fruitful one, that it covers most if not all situations and that its generality and simplicity are both pedagogically and scientifically helpful.

Reviewer: [Wang Songgui](#)

MSC:

[62J10](#) Analysis of variance and covariance (ANOVA)

Cited in **1** Review
Cited in **16** Documents

Keywords:

[infinite arrays](#); [second-order stationary processes](#); [linear models with random effects](#); [association scheme](#); [dispersion models for arrays of random variables](#); [equality constraints](#); [spectral decomposition](#); [dispersion matrices](#); [orthogonal decomposition](#); [main effects](#); [interactions](#); [decompositions of sums of squares](#)

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