

## Brief Notices / Kurze Mitteilungen

Theoretical and Applied Genetics 42, 274 (1972)  
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### Computer Programs to Estimate Genetic Contributions and Related Parameters

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James (1972) has described the algorithm for calculating gene contributions by the manipulation of matrices, and has specified the conditions under which this method is useful. We have written a Fortran IV computer program (CØNTRIB) to estimate gene contributions by James' method. This program is compatible with both IBM 7040/7044 and CDC 3600/6600 computers.

Input data consists of one card per individual of interest, with the individual's identification and those of its sire and dam. The identification code is in three parts-generation number, sex, and the individual number within that generation. There is no limit on the number of generations, and gene contributions of one generation to any later generation may be calculated. Overlapping generations are not catered for, but small modifications would eliminate this requirement.

CØNTRIB calculates the descent matrices from any specified generation ( $t$ ), to each subsequent generation up to the specified final generation ( $t + u$ ) and the proportions of genes from members of generation ( $t$ ) in the population of each subsequent generation.

A statistical subroutine is used to estimate the variance of gene contributions, which for adjacent generations is used then to calculate the "variance effective population number".

CØNTRIB was developed for use with single pair mated lines in which results for male and female ancestors are identical. However, to allow a check on the data, mating descent matrices have not been used. Should the results for the sexes disagree, there must be an error in the data and the program stops.

This feature is very easily removed if the program is to be used for lines with two or more females mated to each male.

CØNTRIB printed output at each generation gives the genetic contributions of base generation families to the generation in question. If desired, these contributions are also punched on cards which are suitable as input for automatic plotting (program CØNPLT) of contributions of base generation families to later generations ("gene spread" diagram). These cards may also be used as input for a small program (LINREL) which computes the genetic relationship between replicate lines derived from the same base families (James, 1962).

The input cards for CØNTRIB can also be used as input for a program (called CRUDEN) to compute inbreeding coefficients ( $F$ ) by the coancestry method described by Li and Roderick (1970). Their program has been modified to be compatible in size with CØNTRIB and to include estimates of "inbreeding effective population number" and variance of  $F$  within generations.

Matrices containing 50 males and 50 females per generation take approximately six seconds of IBM 7040 computing and input/output time. The various program listings, decks, documentation and worked examples are available from the authors.

#### Literature

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Received December 13, 1971

Communicated by J. S. F. Barker

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Sydney, N. S. W. 2006 (Australia)