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Jean-Jacques Snella

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AIR 29 AVR. 1979 576

January 1979

426/1979

FOREWORD

GCM is a Standard Fortran ⁽¹⁾ subroutine designed to provide estimations of the parameters in nonlinear multivariate regressions. It may thus be used to compute parameter estimates of econometric systems in the reduced form. It comprises about 2500 cards, including auxiliary subroutines, and its use does not require any additional subroutine except standard elementary functions.

At first, GCM was designed to estimate complete systems of demand functions using chronological data. It has been successively generalized and makes possible in its present state to estimate a rather wide class of econometric models.

From the viewpoint of numerical method, part of the algorithm used has been tested in the Department of Econometrics of the University of Geneva when estimating systems of demand functions ⁽²⁾. Beside, a new algorithm has been implemented to deal with the difficult case where some parameters of the model are highly correlated ⁽³⁾.

From a formal viewpoint, GCM owes a lot to the NLFIML program written by A. Deaton, formally at University of Cambridge, England ⁽⁴⁾. Computational methods are different, however.

The subroutine which is described here is a modified version of the GCM subroutine which is described in [14]. The programs which have been written for the first version are fully compatible with the new one, however. A summary of this description has been published in [15].

The rather large amount of experiences in nonlinear estimation carried out at the Department of Econometrics has convinced us that the user of such a general program should be able to have some control on the numerical procedure he is using. Care has been taken to include this possibility in GCM.

(1) See [20]. Figures in brackets refer to the bibliography, which is given on pages 65, 66.

(2) See [3], [4], [5].

(3) See [16].

(4) See [7].

Up to now, the GCM subroutine has been used in many econometric studies elaborated by the Department of Econometrics, University of Geneva ⁽¹⁾. In some cases, satisfactory results have been obtained in single precision arithmetic ⁽²⁾. However, in most cases, the double precision version of GCM : DGCM is to be preferred ⁽³⁾.

Lastly, the version of GCM which is described in this document is the October 1st, 1978 version. Consequently, any printout of GCM which makes mention of a posterior date must be considered as coming from a modified version with respect to the one described here.

The author will try to answer any question raised by the use of GCM.

(1) See [17], for instance.

(2) The machines used were a CDC 3800 (48 bits) and UNIVAC 1108 (36 bits).

(3) In DGCM, all variables in the REAL mode are considered to be in DOUBLE PRECISION mode.

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