

STATISTICAL ESTIMATION FRAMES OF ANALYSIS INFLUENCE NOT ONLY OUR RESEARCH AND CONCEPTUAL METHODS, BUT OUR STATISTICAL METHODS AS WELL. STATISTICAL METHODS IN PSYCHOLOGY AND SOCIOLOGY HAVE BEEN DEVELOPED PRIMARILY FOR MODELS USING <sup>-THE</sup> LINEAR ALGEBRA OF RANDOM VARIABLES AS THE MODEL LANGUAGE\* AND DICHOTOMOUS FRAMES FOR THE STATEMENT OF THE MODEL. EXPANDING THE FRAMES TO INCLUDE STRUCTURAL PROPERTIES (AND LEAVING THE LANGUAGE UNCHANGED) ENTAILS THE INVALIDATION OF SOME OF THE FUNDAMENTAL ASSUMPTIONS INVOLVED IN STANDARD DICHOTOMOUS FRAME STATISTICS, AND THUS REQUIRES NEW STATISTICAL METHODS. SUCH METHODS HAVE BEEN DEVELOPED BY ECONOMETRICIANS, WHO HAVE BEEN CONCERNED WITH STRUCTURAL MODELS VIRTUALLY FROM THE BEGINNING (FERBER AND ALLEN, 1971; THEIL, 1971; GOLDBERGER, 1964), AND CAN BE APPLIED TO STRUCTURAL MODELS IN OTHER AREAS (BICKHARD & MURRAY, 1971).

THE PROBLEM OF <sup>STATISTICAL</sup> METHOD IS THUS ALREADY SOLVED IN PRINCIPLE, BUT A PRACTICAL PROBLEM REMAINS - ECONOMETRICIANS TEND TO USE MUCH SMALLER DATA SETS THAN IS OFTEN THE CASE FOR <sup>OTHER</sup> SOCIAL SCIENTISTS, AND DATA SETS WITH A SPECIAL (TIME-SERIES) STRUCTURE. CONSEQUENTLY, THE COMPUTER PROGRAMS AVAILABLE FOR STRUCTURAL ANALYSES TEND TO BE INAPPROPRIATE FOR GENERAL STRUCTURAL ANALYSES IN THREE SENSES: 1) THEY COMMONLY HAVE RELATIVELY SMALL FIXED LIMITS ON THE SIZE OF THE DATA SETS THEY WILL ACCEPT, 2) THEY TEND TO HAVE A TIME SERIES INTERPRETATION OF THE DATA BUILT INTO THEIR METHODS AND PROCEDURES, AND 3), MOST FUNDAMENTALLY, THEY TEND TO USE COMPUTATIONAL METHODS WHICH ARE SIMPLE TO PROGRAM, BUT WHICH HAVE VERY BAD PROPERTIES OF THE ACCUMULATION OF ERROR DURING ACTUAL COMPUTER COMPUTATIONS (BICKHARD, 1970) - THIS IS NOT NECESSARILY OF GREAT WEIGHT FOR SMALL DATA SETS, BUT CAN BE DISASTROUS FOR LARGE DATA SETS.

IN RESPONSE TO THIS PRACTICAL NEED, WE HAVE RECENTLY COMPLETED A COMPUTER PROGRAM FOR THE LEAST SQUARES ANALYSIS OF LINEAR STRUCTURAL MODELS WHICH 1) ACCEPTS INDEFINITELY LARGE DATA SETS (LIMITED ONLY BY THE SIZE OF THE COMPUTER), 2) DOES NOT FORCE ANY PARTICULAR INTERPRETATION OF THE KIND OF DATA INVOLVED (EG. TIME SERIES), AND 3) USES THE BEST COMPUTATIONAL ALGORITHMS KNOWN.

\*FEW SOCIAL SCIENCE MODELS ARE STATED IN, FOR EXAMPLE, PARTIAL DIFFERENTIAL EQUATIONS OR AUTOMATA THEORY.