convergence properties of the assignment algorithm, effects of identical parallelism, cost of algorithm, and effects of size of cluster sets. Also, several studies of the sensitivity of the model to variations in branching probabilities, cycle factors, and unit operation times are described and associated data presented. Finally, a comparison of results with simulations using SIMSCRIPT, including execution times, is presented.

All in all, the results in these three papers contribute significantly to our knowledge of parallel processor modeling and system operation. A great deal more work is needed, particularly on features omitted from this model, such as storage allocation, characterization of memory organization, and dynamic assignments. Indeed, this reviewer believes that work of this type on computer system models is in its infancy. Much activity has recently been directed towards time-shared systems (see Scherr,3 for example), but Karp and Miller4 have also proposed a different computation graph model of parallel computations oriented to other fundamental problems.

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B. ANALOG AND HYBRID COMPUTATION


This paper was written in reaction to a body of literature on continuous parameter tracking that has by and large ignored the use of continuous regression techniques introduced by A. I. Rubin in an earlier paper.1 The case for the use of continuous regression in the parameter tracking problem is presented in a concise and professional manner. A distinction is made between t, the "real world time" employed in the formulation of the model, and in the development of the regression performance measure, and T, the "data processing time" employed in the steepest descent circuits that are performing the minimization of the performance measure with respect to the parameters. This distinction is an important contribution, both analytically and conceptually, to the parameter identification literature; the authors' belief that other workers in the field might profit from this distinction is well founded.

However, as might be expected, some critical comments are in order. The authors favorably compare the simplicity of their method to the output error method presented by Meissinger and Bekey.2 This is not an entirely objective comparison inasmuch as the output error method is addressed to a more difficult version of the parameter identification problem. The performance measure of the output error method is of the form

$$\int_0^T (x(t) - y(t))^2/\hat{A}(x(t) - y(t))dt$$

where

- y is the vector of actual measured variables,
- x is the vector of the corresponding variables from the mathematical model, and
- A is a weighting matrix.

Note that this performance measure is not an explicit, known function of the unknown parameters in the model for determining x. Moreover, there is no relationship between the number of components of y and the number of state variables in the model except the implicit requirement of model observability.

The performance measure employed by the authors is of the form

$$\int_0^T (\dot{y}(t) - f(y, \alpha, \beta))^2 dt$$

where

- \dot{y}(t) = \dot{f}(y, \alpha, \beta)
- y(t) is the measured state vector, and
- \alpha is the vector of parameters.

Note that this performance measure is a known function of the parameters \alpha which assumes complete knowledge of all the state variables in the system.

The authors indicate as a final note that there are techniques for estimating the unmeasured state variables in a system. Unfortunately they do not factor this observation back into their earlier discussions of method complexity and method performance.

In addition, the paper presents some three pages of analog computer block diagrams. In the opinion of this reviewer one or two paragraphs discussing the sequence of control operations employed in distinguishing between real time t and computer time \tau would have been more helpful.

In summary, this paper presents and demonstrates the feasibility of a method for model determination of dynamic systems. Although some of the claims for generality and simplicity can be faulted, the method is obviously useful and this paper should be on the "must read list" of all concerned with the reduction of experimental data from dynamic systems.

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The authors are to be congratulated on their perseverance in coming up with an analog circuit which permits simulation of some of the effects that are observed in a ferroresonant device.

From our standpoint the value of a technique is directly related to the ease and relative accuracy with which one can predict the effect of change in dimensional parameters such as size of airgap, or change in material properties such as hysteresis loss, upon the end performance of the device.

It is not clear to us at this point whether in fact the technique described would permit such practical results. Regrettfully, we have not had the time to delve into the matter more deeply, and specifically into the physical significance of the constants used.

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