INTRODUCTION AND OVERVIEW
SPECIAL SESSION
SEMISTATE THEORY FOR NEURAL NETWORKS AND ROBOTICS

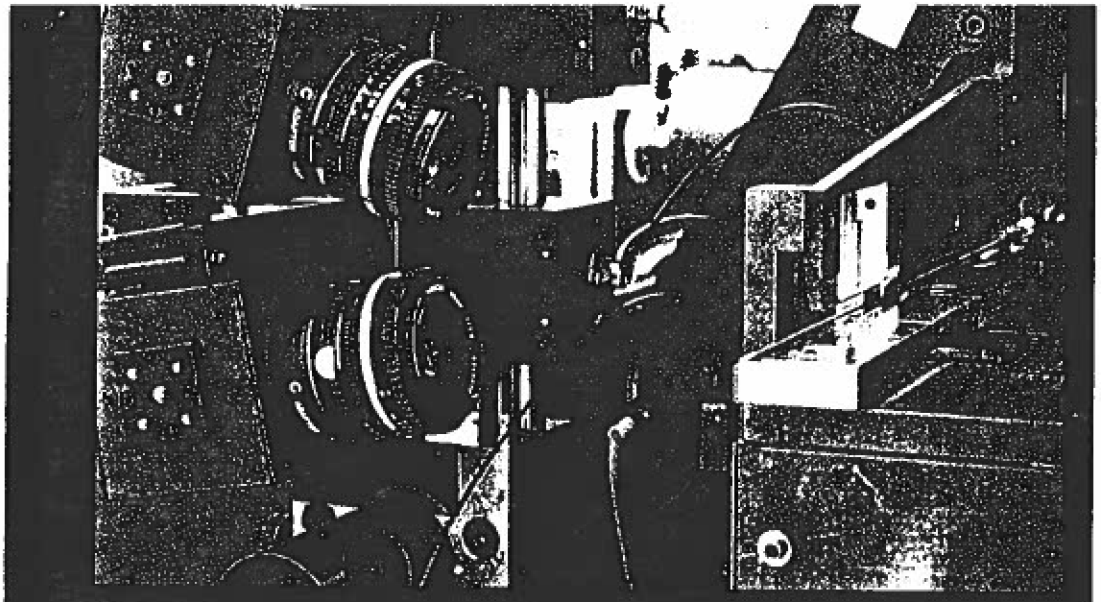
R. W. Newcomb
Microsystems Laboratory
Electrical Engineering Department
University of Maryland
College Park, MD 20742 USA
phone: (301) 405-3662 fax: (301) 314-9281
email: newcomb@eng.umd.edu

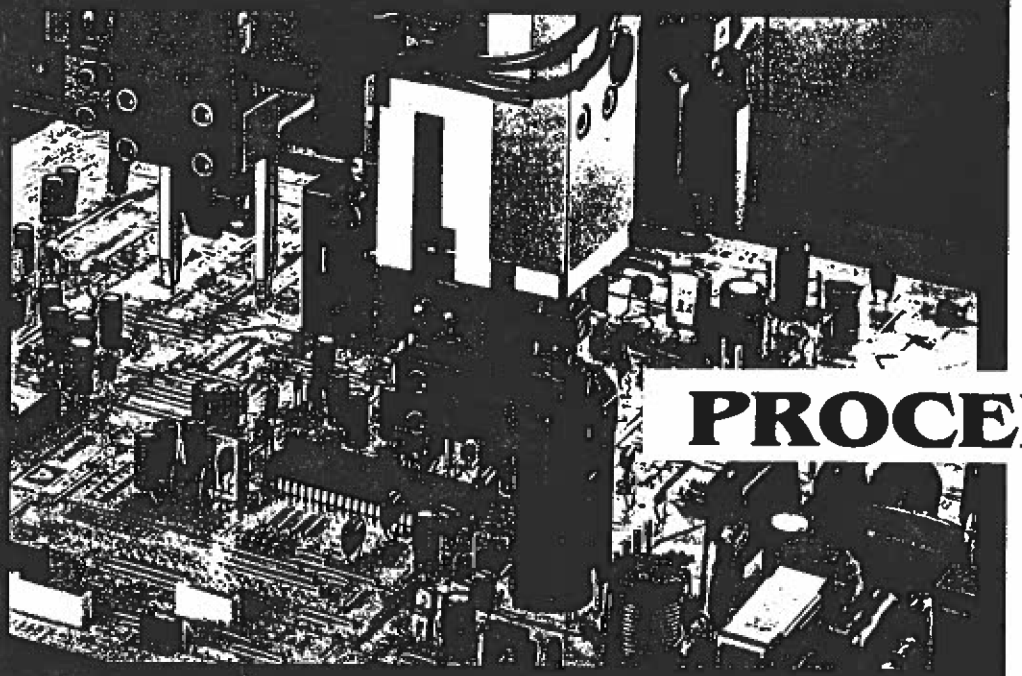
The semistate theory of systems, sometimes called the singular or sometimes the algebraic-differential theory of systems, has as its backbone the canonical semistate equations

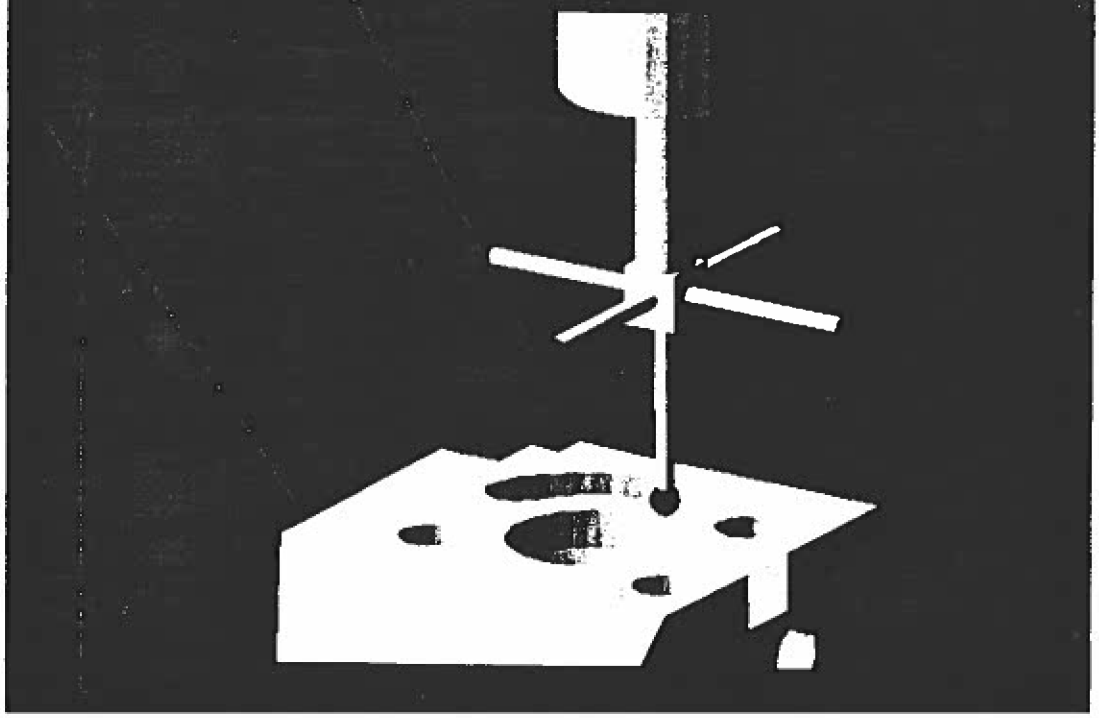
$$E\dot{x} = A(x,t) + Bu \qquad (1a)$$
$$y = Cx \qquad (1b)$$

where x, u, and y are the semistate, input, and output vectors and E, B, C are constant matrices which are usually singular.

In this session several of the papers use these equations for the investigation of different classes of systems. In particular the papers by Syrmos & Syrmos and Rassai and Syrmos show how these equations are useful in characterizing robotic motions in general and for robots tying knots in particular. And because these equations can be of considerable value for the design of neural networks where stability is of the utmost importance, semistate equations are investigated for analysis of stability of neural networks in the paper by Kosmatopoulos & Christodoulou. Because semistate equations can lead to new insights about a system and as neural networks have important uses for learning and recognition, two papers dealing with these aspects are included which, although not directly on semistate theory, allow for cross fertilization of the concepts. These two papers are those by Habib on digital neural networks and Rodellar & Gomez on speech processing and recognition via a neural network which concerns auditory and mechanical characteristics of the ear of possible use in analyzing damage to the inner ear.







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