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Memorandum M-1578

Page 1

Digital Computer Laboratory  
Massachusetts Institute of Technology  
Cambridge, Massachusetts

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SUBJECT: QUARTERLY STATUS REPORT, CONTRACT N5ori-06002  
APRIL through JUNE 1952

To: Dr. C.V.L. Smith  
Head, Computer Branch Office, Office of Naval Research

From: William K. Linvill

Date: August 4, 1952

This report summarizes the work done on ONR Project NR232-001 under the extension of Contract N5ori-06002, for the second quarter of 1952. The bulk of the work continues to be applied to the application of a computer to a control system.

The theoretical study on feedback control systems using digital computers as components has been continued. By methods recently developed, it is as easy to design a sampled-data servomechanism as it is to design one of the conventional type. During this quarter methods have been devised to describe the response characteristics of sampled-data servomechanisms by the error-coefficient method which is often used on conventional servo system design. The use of pole-zero constellations to describe the behaviour characteristics of a system and to compensate it has been made. This technique is similar to the root-locus method introduced by Walter Evans (1) for conventional servo systems. The transient response characteristics of a sampled-data servo can be easily calculated by a partial fraction expansion technique and a new way to calculate approximately the output ripple resulting from the sampling has been devised. These results will be published soon.

Work continues on the investigation of methods to use the ability of the computer to make choices. No further results are ready as yet.

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Memorandum M-1578

Page 2

A new investigation has been started on the problem of using the computer to guide an interceptor to an enemy bomber when the computer input is quantized and sampled radar data on the positions of both the interceptor and the bomber. An initial Memorandum M-1536 (2) has been written on the results of this study and the work is continuing.

Signed William K. Linvill  
W. K. Linvill

WKL: jmm

References:

1. Evans, W. R., Servo Analysis by Locus of Roots Method  
(North American Aviation, Inc.) Aerophysics  
Laboratory Report AL-787
2. Wells, W. I., Detection of Straight Lines from Quantized Samples  
Memorandum M-1536, June 24, 1952, Digital Computer  
Laboratory, M.I.T.

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