

Digital Computer Laboratory
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

SUBJECT: BIWEEKLY REPORT, APRIL 30, 1956

To: Jay W Forrester

From: Scientific and Engineering Computation Group

1. MATHEMATICS, CODING AND APPLICATIONS

1.1 Introduction

During the past two weeks 514 coded programs were run on the time allocated to the Scientific and Engineering (S&EC) Group. These programs represent part of the work that has been done on 63 of the problems that have been accepted by the S&EC Group.

1.2 Programs and Computer Operation

<u>Problem No.</u>	<u>Title</u>	<u>Minutes</u>
100	Comprehensive System of Service Routines	61.1
106 C.	MIT Seismic Project	6.8
120 B,N.	The Aerothermopressor	9.9
122 N.	Coulomb Wave Functions	26.6
126 D.	Data Reduction	73.7
131	Special Problems (Staff Training, Demonstrations, etc.)	28.1
172 B,N.	Energy Bands in Graphite	125.0
193 L.	E.V. Problem for Propagation of E.M. Waves	77.8
194 B,N.	Augmented Plane Wave Method as Applied to Sodium	120.6
203 D,N.	Response of a Building Under Dynamic Loading	27.4
204 N.	Exchange Integrals Between Real Slater Orbitals	17.7
216 C.	Ultrasonic Delay Lines	16.8
219	Linear Programming	77.3
226 D.	Circulation of the Atmosphere	15.6
231 B,N.	Reactor Runaway Prevention	42.5
236 C.	Transient Response of Aircraft to Heating	2.2
244 C.	Data Reduction for X-1 Fire Control	30.8
245 N.	Theory of Neutron Reactions	358.9
253 N.	APW as Applied to Face- and Body-Centered Iron	25.3

256 C.	WWI-ERA 1103 Translation Program	26.5
257 C.	Horizontal Stabilizer Analysis	45.5
261 C.	Fourier Synthesis for Crystal Structures	45.4
262 N.	Evaluation of Two-Center Molecular Integrals	110.2
264 C.	Optimization of Alternator Control System	27.4
266 A.	Calculations for the MIT Reactor	24.5
270 B.	Critical Mass Calculations	151.4
272 L.	General Raydist Solution	92.0
273 N.	Cosmic Ray Air Shower	23.5
278 N.	Energy Levels of Diatomic Hydrides LiH	35.4
288 N.	Atomic Wave Functions	318.5
290 N.	Polarizability Effects in Atoms and Molecules	207.8
293 C.	Rolling Bearings	49.2
297 B.	Diffusion Boundary Layer	11.3
300 L.	Tropospheric Propagation	71.4
306 D.	Spectral Analysis of Atmospheric Data	33.2
312 L.	Error Analysis	31.8
317 C.	Stability Derivatives from Flight Test Data	67.9
319 B,N.	Scattering from a Spheroidal Potential	42.6
327 L.	Prediction Analysis	3.9
329 N.	First Approximation Solution on Ore Body	3.0
330 C.	Postfailure Response in Aircraft Structures	108.6
336 C.	Pattern Identification	11.6
337 N.	Nonlinear Second Order Differential Equations	53.8
338 C.	Optimization of Ram-Air Cooling Systems	37.0
341 C.	Statistical and Dynamic Methods in Forecasting	64.4
343 C.	Weather Prediction	161.0
345 B.	Matrix Multiplication	10.5
346 B.	Complex Spectrum Analysis	41.8
348 A.	Wave Propagation	67.3
351 B.	Non-Uniform Fuel Distribution	11.6
354 D.	Response of a Single Story Concrete Building	32.0
355 B.	Quantitization Error	12.3
356 B.	Partially Continuous Wooden Beams	26.9
357 B.	Propagation of Roundoff Error	63.9

358 B.	Vertical Tail Loads Due to Rolling Pull-Up	17.2
359 B.	Solution of Transverse Web Frame	17.1
360 B.	Dynamic Response of Shear Walls	8.7
361 B,N.	Growth of Fatigue Cracks	1.4
362 B.	Fourier Synthesis for Crystal Structure	15.3
364 C.	Blast Response of Rotor Blades	25.6
365	Problems Concerned with Comparison and Testing of WWI and the IBM 650	3.5
367 B.	Determination of Critical Mass	13.0
371 L.	Atmospheric Propagation of Radio Waves	30.8

1.3 Computer Time Statistics

The following indicates the distribution of Whirlwind I time allocated to the S&EC Group.

S&EC Programs	51 hours, 36.4 minutes
Lincoln Programs	4 hours, 36.9 minutes
Magnetic Tape Test	58.7 minutes
Scope Calibration	6.0 minutes
PETR Test	26.9 minutes
Test Storage Check	9.3 minutes
Demonstrations (#131)	<u>28.1 minutes</u>
Total Time Logged	58 hours, 22.7 minutes
Div. 6 Conversions, Inter-run Operations, etc.	13 hours, 34.5 minutes
Total Time Assigned	72 hours, 12.2 minutes
Usable Time, Percentage	99.65%
Number of Programs	514