

Digital Computer Laboratory  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

**SUBJECT:** BIWEEKLY REPORT, MAY 14, 1956

**To:** Jay W. Forrester

**From:** Scientific and Engineering Computation Group

**1. MATHEMATICS, CODING AND APPLICATIONS**

**1.1 Introduction**

During the past two weeks 594 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 68 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	71.0
106 C.	MIT Seismic Project	53.7
120 B,N.	The Aerothermopressor	101.3
126 D.	Data Reduction	108.6
131	Special Problems (Staff Training, etc.)	25.5
141	S&EC Subroutine Study	7.2
193 L.	E.V. Problem for Propagation of E.M.Waves	84.5
194 B,N.	Augmented Plane Wave Method (Sodium)	33.7
199 N.	Compressible Flow in a Tube	27.2
203 D,N.	Response of a Building Under Dynamic Loading	43.3
216 C.	Ultrasonic Delay Lines	52.1
219	Linear Programming	176.3
226 D.	Circulation of the Atmosphere	3.6
231 B,N.	Reactor Runaway Prevention	13.2
236 C.	Transient Response of Aircraft to Heating	4.3
240 A.	Electrons and Photons in Cascade	4.5
241 B,N.	Transients in Distillation Columns	3.0
244 C.	Data Reduction for X-1 Fire Control	26.6
245 N.	Theory of Neutron Reactions	608.3

253 N.	APW as Applied to Face- and Body-Centered Iron	27.5
256 C.	WWI-ERA 1103 Translation Program	23.6
260 N.	Energy Levels of Diatomic Hydrides	31.9
261 C.	Fourier Synthesis for Crystal Structures	87.5
262 N.	Evaluation of Two-center Molecular Integrals	121.7
264 C.	Optimization of Alternator Control System	52.8
266 A.	Calculations for the MIT Reactor	9.9
270 B.	Critical Mass Calculations	404.5
272 L.	General Raydist Solution	79.5
273 N.	Cosmic Ray Air Shower	37.2
278 N.	Energy Levels of Diatomic Hydrides LiH	117.8
288 N.	Atomic Wave Functions	414.4
290 N.	Polarizability Effects in Atoms and Molecules	118.5
293 C.	Rolling Bearings	52.8
300 L.	Tropospheric Propagation	41.2
306 D.	Spectral Analysis of Atmospheric Data	40.9
309 B,N.	Pure and Impure Potassium Chloride Srystal	37.9
312 L.	Error Analysis	76.1
315 C.	Torpedo Hit Distribution	10.0
317 C.	Stability Derivatives from Flight Test Data	117.0
326 C.	Production for Transportation Study	4.5
327 L.	Prediction Analysis	21.2
336 C.	Pattern Identification	11.5
337 N.	Nonlinear 2nd order Differential Equations	28.7
338 C.	Optimization of Ram-Air Cooling Systems	35.8
339 A.	Solving a Partial Differential Equation	66.8
341 C.	Statistical and Dynamic Methods in Forecasting	11.5
342 B.	Transient Heat Flow in Solids	43.4
343 C.	Weather Prediction	74.7
345 B.	Matrix Multiplication	12.9
346 B.	Complex Spectrum Analysis	29.3
348 A.	Wave Propagation	94.5
351 B.	Non-Uniform Fuel Distribution	36.7
354 D.	Response of a Single Story Concrete Building	14.4
355 B.	Quantitization Error	18.3
356 B.	Partially Continuous Wooden Beams	90.4

357 B.	Propagation of Roundoff Error	3.2
358 B.	Vertical Tail Loads Due to Rolling Pull-Up	6.0
359 B.	Solution of Transverse Web Frame	57.1
360 B.	Dynamic Response of Shear Walls	45.6
361 B,N.	Growth of Fatigue Cracks	9.4
362 B.	Fourier Synthesis for Crystal Structure	6.6
363 A.	Asymptotic Integration of Equations Concerning Torroidal Shell	2.2
364 C.	Blast Response of Rotor Blades	17.8
365	Problems Concerned with Comparison and Testing of Whirlwind I and IBM 650	5.3
367 B.	Determination of Critical Mass	43.8
368 B,N.	Condensation in a Vertical Tube	12.9
371 L.	Atmospheric Propagation of Radio Waves	128.0
373 B.	Flux Leveling in Homogeneous Reactor-Part I	3.4

### 1.3 Computer Time Statistics

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

S&EC Programs	63 hours, 50.5 minutes
Lincoln Programs	7 hours, 10.5 minutes
Magnetic Drum Test	0 hours, 0 minutes
Magnetic Tape Test	1 hour, 4.5 minutes
Scope Calibration	14.0 minutes
PETR Test	34.8 minutes
Test Storage Check	5.7 minutes
Demonstrations (No. 131)	<u>25.5 minutes</u>
Total Time Logged	73 hours, 25.5 minutes
Div. 6 Conversions, Inter-run Operations, etc.	15 hours, 18.2 minutes
Total Time Assigned	89 hours, 59.7 minutes
Usable Time, Percentage	98.59%
Number of Programs	594