

Digital Computer Laboratory  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

SUBJECT: BIWEEKLY REPORT, APRIL 28, 1957

To: Frank M. Verzuh

From: Scientific and Engineering Computation Group

1. MATHEMATICS, CODING AND APPLICATIONS

1.1 Introduction

During the past two weeks 508 coded programs were run on the time allocated to the Scientific and Engineering (S and EC) Group. These programs represent part of the work that has been done on 47 of the problems that have been accepted by the S and EC Group.

1.2 Programs and Computer Operation

| <u>Problem No.</u> | <u>Title</u>                                    | <u>Minutes</u> |
|--------------------|-------------------------------------------------|----------------|
| 100                | Comprehensive System of Service Routines        | 70.4           |
| 106 C.             | MIT Seismic Project                             | 44.6           |
| 126 D.             | Data Reduction                                  | 107.4          |
| 131                | Special Problems (Staff Training, etc.)         | 5.7            |
| 193 L.             | E.V. Problem for Propagation of E.M. Waves      | 200.1          |
| 194 B,N.           | Augmented Plane Wave Method (Sodium)            | 700.0          |
| 203 D,N.           | Response of a Building Under Dynamic Loading    | 150.0          |
| 204 N.             | Exchange Integrals Between Real Slater Orbitals | 82.2           |
| 245 N.             | Theory of Neutron Reactions                     | 35.7           |
| 253 N.             | APW as Applied to Face- and Body-Centered Iron  | 67.3           |
| 256 C.             | WWI-1103 Translation Program                    | 36.3           |
| 257 C.             | Horizontal Stabilizer Analysis                  | 126.4          |
| 261 C.             | Fourier Synthesis for Crystal Structures        | 20.3           |
| 262 N.             | Evaluation of Two-center Molecular Integrals    | 146.1          |
| 273 N.             | Cosmic Ray Air Shower                           | 240.1          |
| 274 N.             | Multiple Scattering                             | 30.4           |
| 278 N.             | Energy Levels of Diatomic Hydrides LiH          | 377.7          |
| 285 N.             | APW as Applied to Chromium Crystal              | 149.3          |
| 288 N.             | Atomic Wave Functions                           | 255.5          |
| 290 N.             | Polarizability Effects in Atoms and Molecules   | 181.7          |
| 293 C.             | Rolling Bearings                                | 25.0           |
| 312 L.             | Error Analysis                                  | 56.5           |
| 317 C.             | Stability Derivatives from Flight Test Data     | 184.0          |
| 327 L.             | Prediction Analysis                             | 138.2          |
| 336 C.             | Pattern Identification                          | 58.3           |
| 337 N.             | Nonlinear 2nd Order Diff. Eqs.                  | 18.3           |

|          |                                                                |       |
|----------|----------------------------------------------------------------|-------|
| 341 C.   | Statistical and Dynamic Methods in Forecasting                 | 61.8  |
| 360 B.   | Dynamic Response of Shear Walls                                | 29.7  |
| 361 B,N. | Growth of Fatigue Cracks                                       | 19.0  |
| 364 C.   | Blast Response of Rotor Blades                                 | 38.2  |
| 368 B,N. | Condensation in a Vertical Tube                                | 17.5  |
| 377 L.   | Coverage Analysis                                              | 27.4  |
| 386 C.   | Free Convection                                                | 17.0  |
| 387 C.   | Determination of Velocity Potential                            | 20.8  |
| 388 D.   | Temperature Distribution Aircraft Generators                   | 53.7  |
| 389 D.   | Supersonic Flow of Air in a Tube                               | 41.2  |
| 394 C.   | Automatic Programming for Machine Tools                        | 50.3  |
| 395 L.   | Phase Error Calculation                                        | 39.4  |
| 400 C.   | Temperature and Stress Response                                | 51.4  |
| 402 N.   | Monte Carlo Inventory Control Study                            | 9.4   |
| 403 B.   | Transient Heat Transfer                                        | 24.4  |
| 404 B.   | Core Optimization                                              | 121.7 |
| 405 B.   | Fuel Composition in Nuclear Reactors                           | 61.2  |
| 406 B.   | Numerical Method of Maximizing or Minimizing an n<br>Dimension | 29.1  |
| 407 C.   | Diffusion Boundary Layer                                       | 20.6  |
| 409 C.   | An Analytical Study of Bluff Bomb Trajectories                 | 53.9  |
| 410 B.   | S <sub>2</sub> Approximation for Flux Flattening               | 32.4  |

### 1.3 Computer Time Statistics

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

|                                                  |         |           |
|--------------------------------------------------|---------|-----------|
| S and EC Programs                                | 64 hrs. | 20.3 min. |
| Lincoln Programs                                 | 7 hrs.  | 41.6 min. |
| Magnetic Tape Test                               |         | 47.8 min. |
| Scope Calibration                                |         | 15.5 min. |
| PETR Test                                        |         | 32.0 min. |
| Test Storage Check                               |         | 10.8 min. |
| Demonstrations (no. 131)                         |         | 5.7 min.  |
| Total Time Logged                                | 73 hrs. | 53.7 min. |
| Div. 6 Conversion, Inter-run<br>Operations, etc. | 6 hrs.  | 13.9 min. |
| Total Time Assigned                              | 86 hrs. | 6.6 min.  |
| Usable Time, Percentage                          | 93.05%  |           |
| Number of Programs                               | 508     |           |