CHAPTER V

COMPARATIVE STUDIES

Comparison of Optimum and Non-optimum Operation

For comparison, the optimum and non-optimum load division are plotted against the total load demand in Fig. 5-1, and the comparison of the corresponding energy inputs are shown in Fig. 5-2. It can be seen that as the total load demand increases, the difference between the optimum and non-optimum also increase.

The Number of Iterations on Various Loads

In Fig. 5-3, the iteration of optimum solution calculation is plotted against the total load demand. The average number of iteration is about 12, and the maximum number of iteration is only 19. Therefore, the new direct search method used in this study is the practical one.

Convergence Rate of the Algorithm

In general, the convergence rate of an optimum seeking algorithm is an important criterion for evaluation of the algorithm. To show the convergence of the new direct search method used in this case study, the values of P and F are plotted against the iteration number as shown in Fig. 5-4. Since the value of P depends on the value of r and the others. The vaule of P is changed when r is reduced in each iteration as can be seen in Fig. 5-4.

EGAT SUBJECT ________ SHEET No ________

EFFICIENCY WORK ________ UNIT No ________

SECTION

SOUTH BANGKOK DATE ________

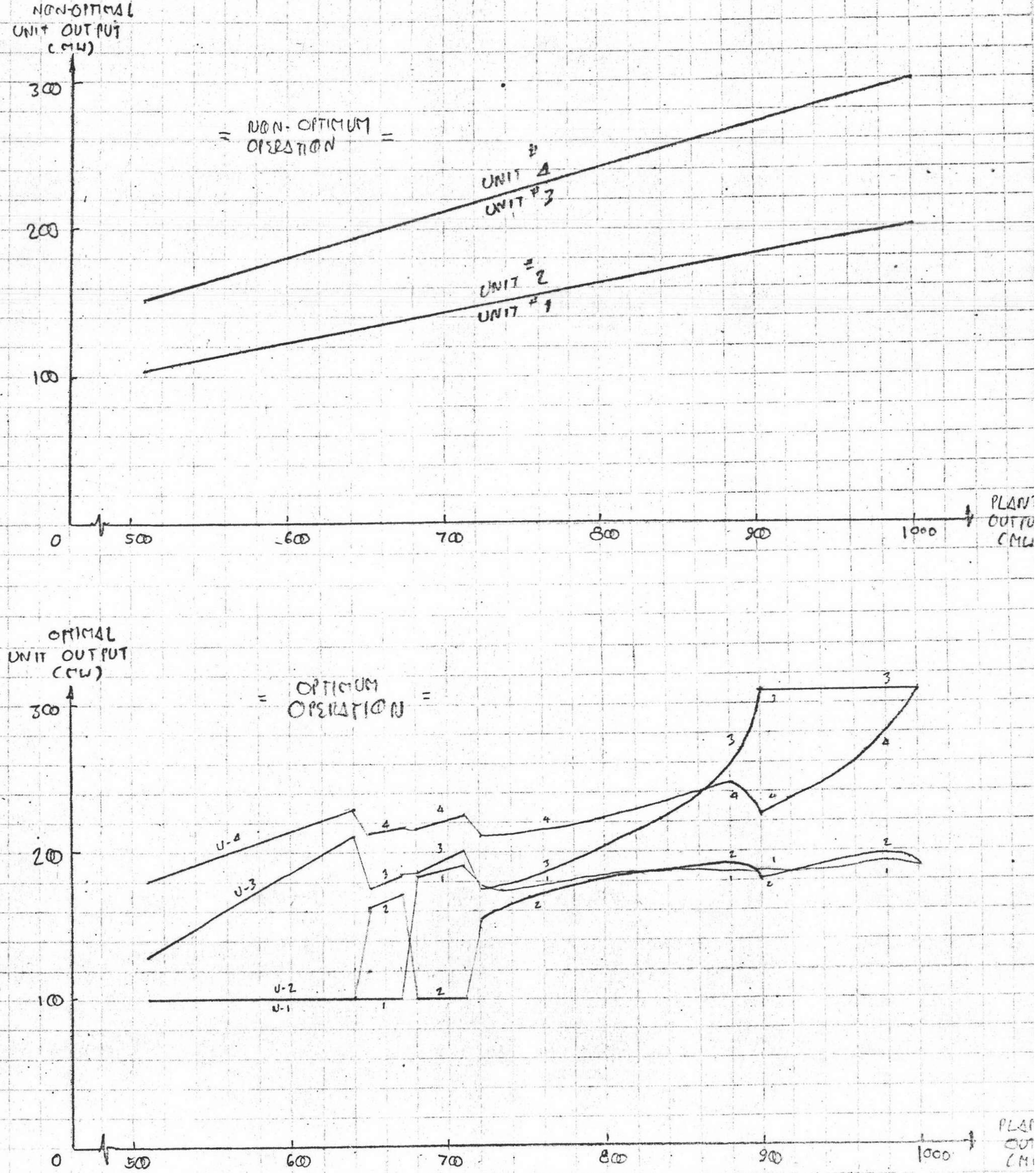

FIG-5-1. THE OPTIMUM AND NON-OPTIMUM OPERATION

EGAT SUBJECT ______ SHEET No ______

EFFICIENCY SECTION WORK ______ UNIT No ______

SOUTH BANGKOK DATE ______

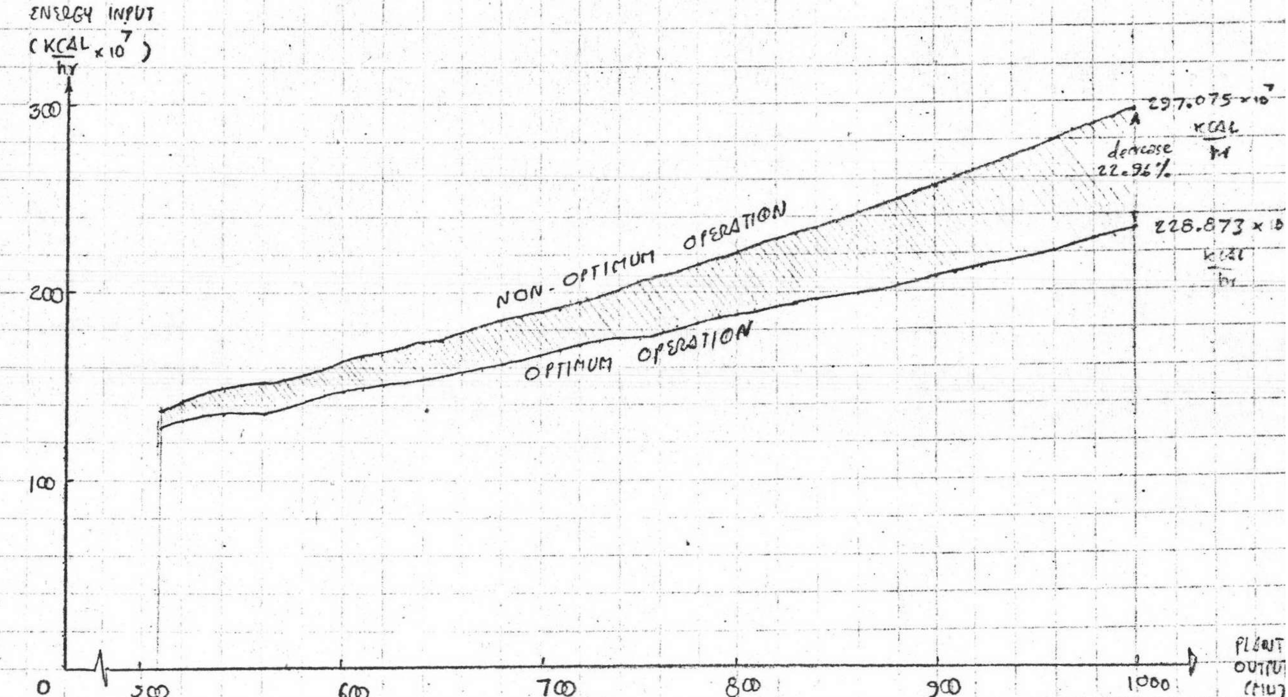

FIG.5-2 THE OPTIMUM AND NON-OPTIMUM ENERGY INPUT

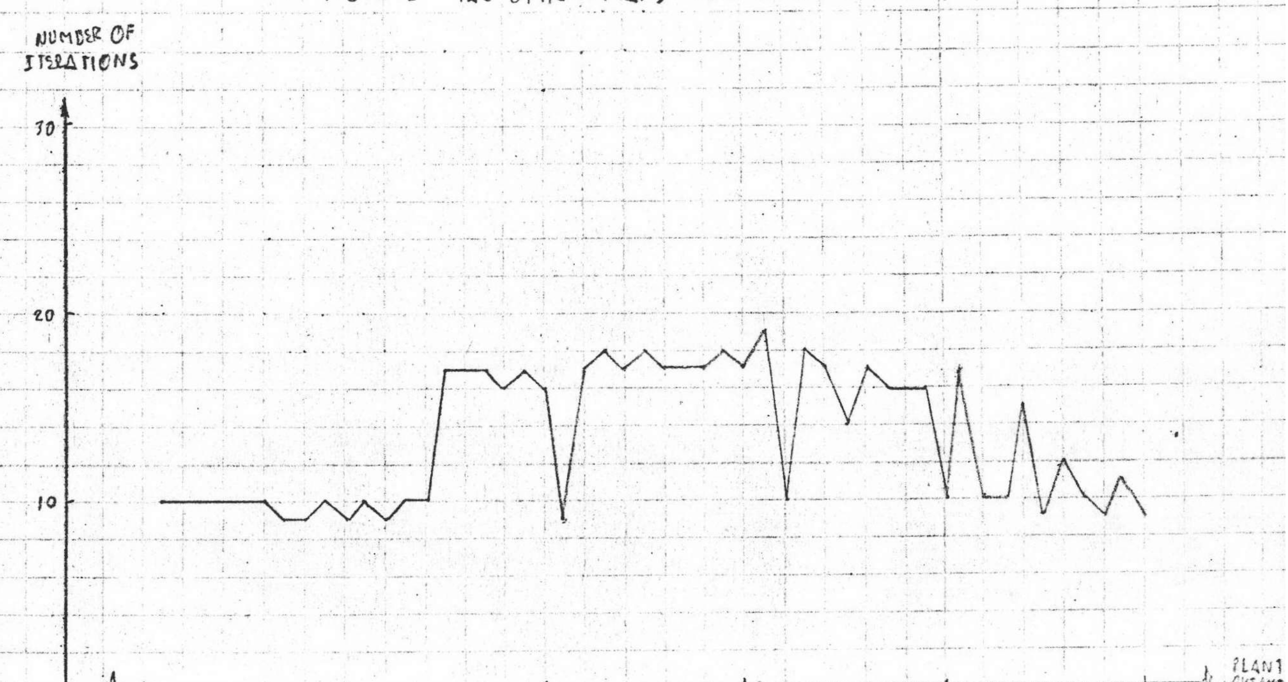

FIG. 5-3 THE ITERATION VERSUS THE TOTAL OUTPUT.

EGAT SUBJECT SHEET NO

EFFICIENCY WORK UNIT NO

SECTION

SOUTH BANGKOK DATE

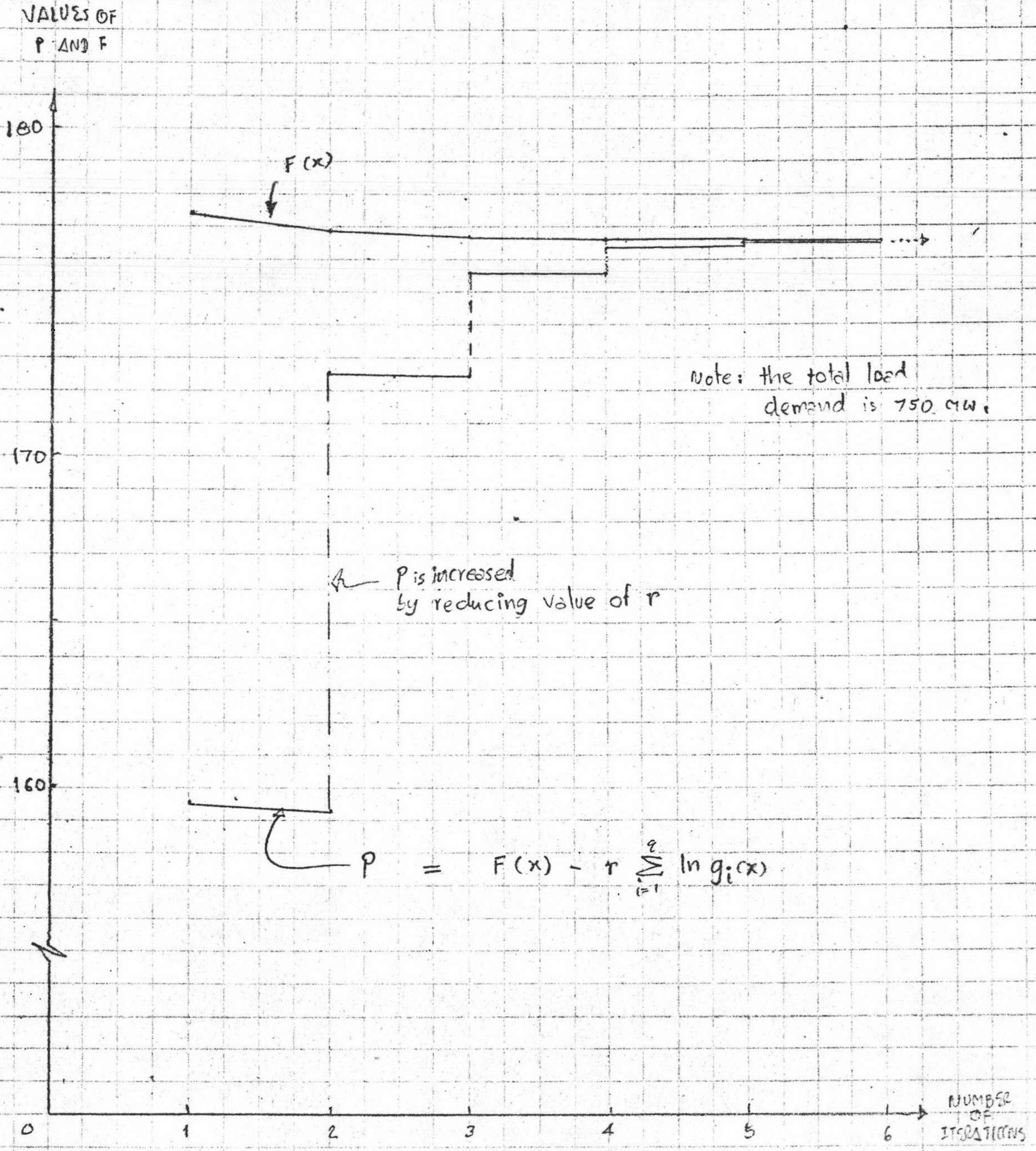

FIG. 5-4. THE CONVERGENCE RATE OF THE ALGORITHM.

CHAPTER VI

CONCLUSION AND RECOMMENDATION

This study uses a new direct search algorithm which combines the Brooks' minimization technique and Rosenbrock's direct search method for determining the optimum solution of a load distribution problem. As a result of this study, the following conclusions may be made.

(a) The new direct-search nonlinear programming method presented in this study can solve the problem in the real situation more economically, regardless of the number of parameters of the problem. Furthermore, the approach is well applicable to a problem with constraints.

(b) The results from the case study give the total input energy of 228.873×10^7 KCAL/hr at the nominal rating of 1000 megawatts. For the same conditions, the old operation schedule requires the total input energy of 297.075×10^7 KCAL/hr at the same nominal rating. So this algorithm provides a solution which will decrease the overall input energy about 23 per cent compared with the old operation schedule.

(c) When a unit shutdown exists, the operation schedule can be re-calculated very easily by changing the input data of this computer-program.

(d) For the case study, the solution in the vicinity of optimum can be reached in a small number of iterations.

Recommendation for Further Study

Based upon work undertaken by this study, there are many lines for further study, for example:

(a) The n-unit load distribution problem can be extended to an economic dispatching of the entire power system including the loss in transmission lines and the new direct search approach may then be modified for this problem to optimize it.

(b) The computer program of this study can be developed for the on-line economic dispatching applications which is the future planning of the Central Dispatching Centre (CDC).