

five times faster than IP when $\varepsilon = 10^{-3}$. Table 4 shows the number of iterations (number of the linear programming subproblems solved during the course of computation) of the branch and bound algorithm is an order of magnitude smaller than IP. This suggests that the CPU time of branch and bound algorithm should be much smaller if we implement the algorithm at the level of sophistication of CPLEX code.

4.3. Quality of the First Solution of the BBD Algorithm

Let us now closely look into the quality of the first solution obtained by BBD algorithm. Surprisingly, it turned out that this solution is in fact a global optimal solution for 500 problems out of 720 problem instances. Also, the average difference from the true optimal solution is only 0.02%. Note that when the amount of fund is 2 billion yen, total transaction cost associated with an optimal solution is no more than 3 million yen, whose 0.02% is 600 yen which is only 3×10^{-6} of the total investment.

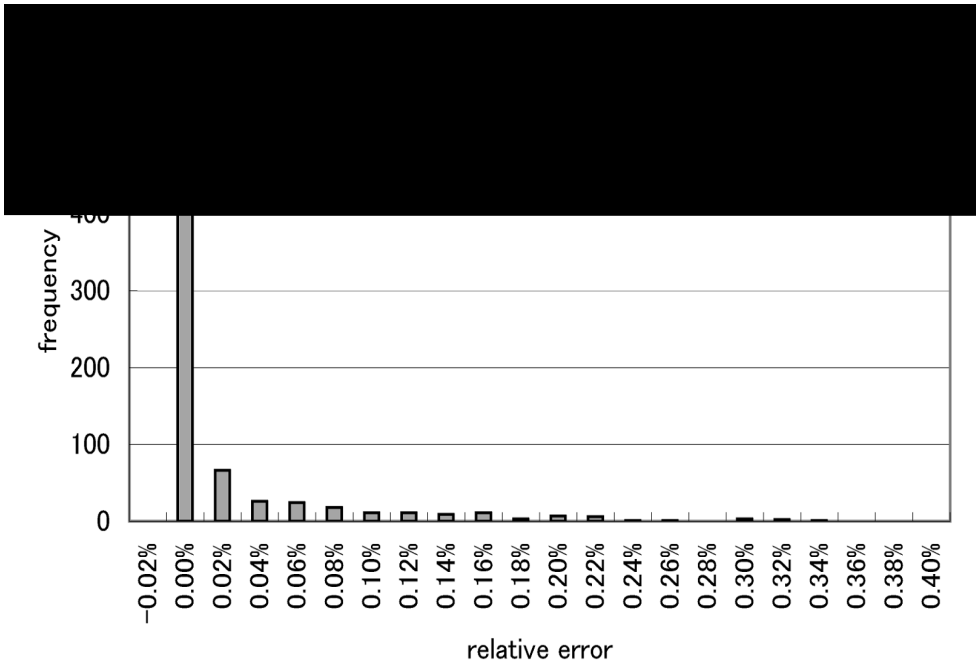


Fig. 3. Histogram of Relative Error

Table 5. Statistics of Relative Error

	relative error
mean	0.02%
st.dev	0.06%