

## Day 4 (Poster F)

Shota Miyagi, Waseda University

Title: Execution Time Estimation of Remote Quantum Annealing Servers

Abstract:

There are many combinatorial optimization problems such as the traveling salesman problem, the knapsack problem, the maximum cut problem, and so on. Most of these problems belong to the class of NP-hard problems, and require large computation time on Neumann-type computers as the size of the problem increases. Recently quantum annealing computers have been paid attention as a solver to such combinatorial problems and several commercial servers have become available. A combinatorial problem is converted to an Ising model which is a set of correlating spins defined by correlation coefficients and self-energy. Spin can take 1 or -1 and the total energy is defined as the sum of the multiplications of two spins and their coefficients and the sum of the multiplications of a spin and its self-energy. Quantum annealing computer searches the spin state that minimizes the total energy. In this presentation, we use the quadratic allocation problem to estimate and discuss the execution time including data communication time and accuracy of the solution when solving it on remote quantum annealing servers. The running time is evaluated on several problems with different size and the accuracy of the solution is evaluated by varying the annealing parameters.

The work was done in collaboration with Nozomu Togawa and Shinji Kimura (Waseda University).