Applications of quantum annealing in combinatorial optimization

Yarkoni, S.

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Sheir Yarkoni

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Promotores:	Prof. Dr. T.H.W. Bäck
	Prof. Dr. A. Plaat
Co-promotor:	Prof. Dr. F. Neukart
Promotiecommissie:	Prof. Dr. K.J. Batenburg
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Contents

Glossary

$\mathcal{T}$	Universal Turing machine.
$\mathcal{Q}$	Universal quantum Turing machine.
$\mathbb{R}$	The field of real numbers.
$\mathbf{B}$	The domain of Boolean values, $\{0, 1\}$.
ψ	Wave function of a single qubit.
$\|0\rangle$,$\|1\rangle$	Qubit computational basis states in bra-ket notation.
$\sigma_x, \sigma_y, \sigma_z$	The 2×2 Pauli-x, -y, and -z spin operators.
$\mathcal{H}$	Generic Hamiltonian operator.
$\mathcal{H}_i$	Initial Hamiltonian operator for Adiabatic Quantum Computing and quantum annealing.
$\mathcal{H}_f$	Final Hamiltonian operator for Adiabatic Quantum Computing and quantum annealing.
τ	Timescale of evolution for a time-dependent Hamiltonian.
x	Vector of N binary variables, $x_i \in \{0, 1\}$.
$\mathbf{Q}$	$N \times N$ QUBO matrix for binary variables.
s	Spin variable $s_i \in \{-1, 1\}$.
h_i	Linear weight for spin variable s_i (also known as bias).
J_{ij}	Quadratic interaction term for spin variables s_i and s_j (coupling strength).
$\mathcal{U}(a, b)$	The uniform random distribution between given points a and b.

$\mathcal{N}(\mathbf{0}, \mathbf{I})$	The standard multivariate normal distribution.
log	Natural logarithm.
$\log_2$	Natural logarithm (base 2).
${}_nC_k$	Binomial coefficient, "n choose k".