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(54) INTERACT CALCULATION IN A QUANTUM ANNEALING OPTIMISATION PROCESS

(57) A method for applying a quantum annealing optimisation process for identifying a candidate schedule. The method comprises generating, by a process optimization computing device, a set of P schedules; applying, by the process optimization computing device, a quantum annealing optimisation process by recursively updating the set of P schedules; and identifying, by the process optimization computing device, a candidate schedule from the recursively updated set of P schedules. For each of the recursively updated set of P schedules, an alternative schedule is generated, by the process optimization computing device, and is compared, by the process optimization computing device, to the each of the recursively updated set of P schedules based on a comparison of a quantum term for the each of the recursively updated set of P schedules and of a corresponding quantum term for the alternative schedule, wherein a quantum term is calculated using an interaction function configured to output an interaction value Q for two schedules S1 and S2 of the recursively updated set of P schedules;. The using, by the process optimization computing device, the interaction function to output the interaction value Q for the schedules S1 and S2 further comprises: receiving as an input a binary encoding E1 for the first schedule S1 and a binary encoding E2 for the second schedule S2, wherein the binary encodings E1 and E2 include a same number of bits; initialising the interaction value Q to zero; setting a value of N to a value of one or more; setting a binary variable A as the first N bits of the binary encoding E1 and setting a binary variable B as the first N bits of the binary encoding E2; updating the interaction value Q based on a Hamming weight calculation for a binary variable derived from an XOR operation applied to the binary variables A and B; as long as the binary encoding E1 comprises one or more M bits after the binary value A and the binary encoding E2 comprises one or more M bits after the binary variable B, re-setting the binary variable A as being the first L bits of the one or more M bits of the binary encoding E1, with $L \leq M$, re-setting the binary variable B as being the first L bits of the one or more M bits of the binary encoding E2 and repeating the updating; and outputting the interaction value Q for the schedules S1 and S2.

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