

M2 MSIAM

Internship proposal 2020-2021

Model preprocessing for stochastic optimization

Preliminary design is an early phase of every design process in which, based on a given architecture of the device under design, the corresponding physical model is set up and computations are made to establish the characteristics that fits the performances. Such a model needs the values of some input variables, also called design parameters, in order to compute the performances, but, in reality, if the performances are given as requirements by a customer, it is not the case of the design parameters. The designer is therefore faced to an inverse problem, that consists in obtaining the values of the design parameters corresponding to the best attainable target performances (notion of global optimum).

We are interested in developing methods to find best solution to inverse problems belonging to the fields of engineering, using population based stochastic algorithms such as GA and PSO. In order to improve the ability of such algorithms to find the best solution, a preprocessing of the mathematical model is helpful. A kind of preprocessing aims at (i) finding bounds to variables that lacks or lower or upper bound, ii) providing bounds to inequality type constraint functions that are unbounded below or above, (iii) reducing intervals on variables and also (iv) on inequality constraints. To do so, constraint propagation techniques such as optimization based bound tightening (OBBT) and/or feasibility based bounds tightening (FBBT) will be investigated and applied to problems belonging to engineering fields.

Applications are to be submitted by email to
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