

SHORT NOTE ON USING HIGGS FIELD MECHANISM IN OPTIMIZATION PROBLEMS FOR THE INTRODUCTION OF “WEAK” BOUNDARIES

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Abstract. *For many optimization problems the question of introducing so called “weak” or “soft” boundary conditions is important. However, the uncertainty and very often “distributed character” of some conditions makes it difficult or just cumbersome to introduce them as ordinary constraints, by adding another dimension (condition), for instance. In some cases it is simply the fact that one discovers their importance after having created and honed an optimization algorithm and finds it difficult or even impossible, to adapt the procedure to the newly found “weak” aspects. In this short note it will be shown how the Higgs field mechanism can be applied in order to add “weak” or “soft” boundary conditions into the optimization algorithm simply by the creation of inertia or mass. It will be demonstrated how the mechanism adapts an existing optimization routine or algorithm, by introducing one or more scalar fields contributing to a certain system immanent viscosity becoming dependent on system parameters or variables the moment these variables or parameters are running into crucial limits with large uncertainties. In this case the “system immanent viscosity” (or inertia or mass) hampers the whole system, which is to say the whole optimization procedure, in its progress with respect to proceed in a certain direction. As a results, the procedure avoids or by passes those “solutions” which are undesired by the “weak” or “soft” boundary conditions in an equally “soft” manner.*