Title:	Continuum clockwork as a de- constructed extra dimension
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Abstract:	There are many cases in the Standard Model in which there is a huge hierarchy between parameters with no explanation in the fundamental theory. Consider, for example, the range of fermion masses: varying from 0.511 MeV for an electron to around 173 GeV for the top quark. ”Naturally”, we would have expected their masses to be of the similar order since they arise from similar interactions in the Standard Model. We also have a huge hierarchy between the Electroweak symmetry breaking scale(~246 GeV) and the Planck scale(~ 10 16 TeV). The whole void between these two scales is not understood at all. And it would be nice if these two scales can somehow be linked to each other, so that the Physics at intermediate scales can also be understood. An elegant way to resolve these is to consider the possibility of extra dimensions, which forms a part of this project. Both large extra dimensions and warped extra dimensions are considered in this project The way out of such hierarchies in the Standard Model is not just extra dimensions. One other way to resolve hierarchies is the clockwork mechanism, which is a 4-D mechanism involving certain type of interactions between different fields. The results of this mecha- nism are, in a certain sense, similar to extra dimensional theories. As such, in this project, this mechanism implemented on a large number of fields is compared to a five-dimensional theory with a certain metric and the extra coordinate discretized. There exists a correspon- dence between the two in the sense that the continuum limit of the discrete theory matches the de-constructed five dimensional free field theory. This correspondence is further ex- plored in the project and certain limitations are found.
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