Critical Review

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This paper is to review a seminar named **Recent advances in Large Scale Finite Element Solvers** given by Prof. Santiago Badia. The purpose of this talk is to discuss the solution to the linear system of Large scale finite element problems on super computers. The speakers talk about solvers for heterogeneous problems, embedded boundary methods and also on the advances in space time solvers. The presentation was well structured with an informative introduction about the team and how they started working on the problem, main body and finally a conclusion.

In the introduction, Prof. Santiago introduced his team at the Large scale scientific computing team, CIMNE and spoke about their motivation for researching in this field. With the recent developments in super computing, he predicted speeds of 1 exaflop/s by year 2020 and how this will greatly improve the scientific computing especially in the fields of climate modeling and combustion modeling. The introduction slides were well structured, with figures to make it easier for the audience, however, he quickly jumped from the motivation to the core topics of the lecture and there seemed to be a lack of continuity.

The main body of the seminar started with the topic on weakly scalable algorithms. Various algorithms for multilevel domain decomposition of large scale computing were discussed. A large amount of time was spent in analyzing equations and tables on weakly scalable algorithms which were overcrowded in the slides and lacked clarity. A much better approach would have been to give the audience, an overall idea on the topic rather than delving into the deeper aspects of the algorithms. Prof. Santiago, then moved onto the topic on solvers for heterogeneous problems. The idea was explained much more lucidly, with figures and only relevant equations in the slides which were well structured, however, due to the time constraint, the speaker was forced to move faster through the following topics on embedded problem solvers and space time solvers. The audience were not able to grasp these topics due to a lack of time management.

The presentation lacked slides on conclusion of the topic. There could have been more interaction with the audience and diverse tools such as videos could have been used to enhance the delivery of more complex content. However, Prof. Santiago provided the references for future reference and also gave links to download the open source codes for the algorithms explained, which gave enough opportunity for the ones really interested to go further.