

Title: **Chapter 13 - Space Time Mesh Refinement**

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A very interesting and rigorous presentation of current developments by the authors on the problem of grid refinement by using non-matching grids. The challenge this type of discretization presents is the effective communication or interpolation of the solution between the coarse and fine grids, without introducing dispersion. In this particular case the authors also use a different time step on the grids to keep the mesh Courant ratio close to an optimum on both coarse and fine grids, thus minimizing spurious oscillations.

There are many practical applications of such an scheme such as aeroacoustics and the solution of Maxwell's equations.

The idea the authors propose for the interpolation is based on ensuring stability by using a the numerical conservation of energy between domains. The scheme is presented and analyzed using the equations of elasto-dynamics as a base, however it can be extended to many other problems.

A few different variations of the scheme are presented together with the error analysis and some numerical examples that show the relative merits of the different approaches. It is worth to mention that the scheme is generalized to deal with any refinement rate.