Adaptive Post-Processing Method to Represent High-Order Numerical Solutions

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The last decades have focused efforts on the development of high precision (hp) schemes. Among these, most popular ones rely on the decomposition of the searched function into a high order piecewise polynomial basis. We can quote high order finite element, boundary element methods or discontinuous Galerkin (DG) schemes. Surprisingly, the development of visualization tools suited for these schemes does not seem as much important. Indeed, most of softwares used to represent numerical solutions do not propose any high order entry or are restricted to some specific basis functions. Actually, one usually performs a post-processing of his solution (fnum) to feed the software with compatible data. A common way is to divide mesh cells into smaller ones and plot nodal values on this finer grid. However, the number of subdivisions is generally fixed arbitrary and thus the visualized solution (fvis) can be far from fnum . Aim of this presentation is to define a ”well-suited” visualization for hp solutions. The method we propose is based on an adaptive meshing of each cell in order to minimize both the error between values of fnum and fvis and the difference between their supports.