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Unstructured Stratigraphic Grids: Construction, Population and Visualization Issues

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Classical flow simulators are based on structured stratigraphic grids where all the cells have a cubic shape. Flow simulators based on unstructured grids with polyhedral cells is now more and more considered as The new generation of flow simulators. From a theoretical point of view, thanks to their flexibility, unstructured grids should allow a better modeling of complex geological structures. However, from a practical point of view, there are still some important open problems which must absolutely be solved. Among the most important of these open problems, we can mention the construction of these grids, their visualization and the generation of associated fine scale geostatistical models. In this article, we present an outlook of solutions to these problems which were recently developed in the frame of the gOcad consortium. In particular, we present a brand new paradigm, called “geochron” allowing high resolution geostatistics to be performed in an optimal way whatever the geometry of the flow grid. The geochron model based on a new 3D parameterization of the geological space gives also elegant solutions to the upscaling and visualization problems related to unstructured grids. The generation of unstructured grids in presence of oblique or horizontal wells is also considered.