Implicit approach as a new age in geological modelling

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Implicit modelling has been firstly invented in the early 2000s and over the last years it has become the well developed and highly promising technology for geological wireframe modelling. Improved time efficiency, visually more pleasing shapes of geological features and ease of dynamic updating are among the reasons for the success of this technology.

This type of modelling is fully based on Radial Basic Functions (RBF), a mathematical function whose value essentially depends on the distance from a sample point (Stewart M. et al., 2014). The techniques allow rapid creation of boundaries with arbitrary geometry to describe for example faults, weathering and lithological contacts from a variety of data sources including drill holes, geological, geophysical and geotechnical survey and mining plans. The modeller is able to manipulate these surfaces to create volumes and domains, which in a geological context may represent features such as mineralised zones, lithological and structural domains, mining blocks or zones of geochemical contamination.

The way of modelling based on spatial data has been in many ways revolutionised by implicit approach. Much less time is required to model complex systems (weeks instead of months) and to dynamically update of these models in light of new data. This modelling can be applied at any stage of project development, from early scoping studies (for quick pre-resource estimation and operative corrections of exploration programmes) up to operational mining (for creating a model which can be dynamically and automatically updated with a new data). As an addition, implicit techniques can be successfully implemented for lithological modeling and particularly for developing models for large strategic PGE-bearing intrusives on Fennoscandinavian shield.

At the same time, this approach often demands a higher level of competency from the modelling team and failure cost in that case increase dramatically. But once the modeller has successfully navigated this mathematical jungle, it should allow creation of models that properly reflect an interpretation of the underlying data, without the necessary limitations of classical (explicit) approach.