INTRODUCTION

Mineral resource estimation requires accurate geometric models of irregular 3D orebody boundaries that are created using efficient and flexible modeling techniques. The objective of this study was to compare the efficiency, flexibility, and accuracy of an alternative, "implicit" geometric modeling approach (employed by Leapfrog™ software) to those of traditional "explicit" contour methods used by industry-standard general mining software packages (GMPs) such as MineSight®.

Implicit modeling is based on a fast method of global interpolation using Radial Basis Functions. Implicit modeling is much more efficient than the traditional, contour modeling method using MineSight® software. A total of 70 implicit models were created using Leapfrog™ software. Implicit models fall into two categories: semi-automatic and interpretation. Semi-automatic models are generated using only drill hole contact points. Interpretation models incorporate subjective geological interpretation in the form of digitized polylines.

RESULTS

The measured RMSE distance accuracy of the traditional MineSight model was 2.06m. The implicit method generated a wide range of geometric models with accuracies that were comparable to that of the MineSight® model. The measured RMSE distance accuracy of the implicit MineSight model was 2.08m.

CONCLUSIONS

The new implicit method of geometric modeling is as accurate as the traditional modeling method. Implicit modeling is much more flexible since it allows incorporation of multiple geological interpretations that are conditional to the same data. The new "conditional geometric modeling" workflows used in this study provides a range of accurate models that represent a range of geologically-realistic orebody boundaries that can be used in mine planning or for quantifying the uncertainty of resource estimations.

Implicit resource and reserve models can be updated with new drilling information on a daily, rather than a semi-annual or annual basis. Maintenance of "evergreen" geometric models provide for regular mine production/reserve reconciliations that increase the efficiency of mining operations.

Traditional Model (blue) – Implicit Model (green)