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Earth Sciences : Quantitative Geology

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Ore Reserve Estimation and Strategic Mine Planning

Stochastic Models and Optimizations with Case Studies

- **State-of-the-art technologies for risk-based orebody modelling and mine planning, optimization and risk management**
- **Conditional simulation framework founded upon new fast and efficient methods for enhancing metal recovery and mine profitability**
- **New uncertainty-based optimization formulations for mine design and production scheduling, capturing upside potential and minimizing downside risk of a mine/project**

The mining business faces continual risks in producing metals and raw materials under fluctuating market demand. At the same time, the greatest uncertainty driving the risk and profitability of mining investments is the geological variability of mineral deposits. This supply uncertainty affects the prediction of economic value from the initial valuation of a mining project through mine planning, design and production scheduling. This book is the first of its kind, presenting state-of-the-art stochastic simulation and optimization techniques and step-by-step case studies. Quantification of geological uncertainty through new efficient conditional simulation techniques for large deposits, integration of uncertainty to stochastic optimization formulations for design and production scheduling and the concurrent management of risk are shown to create flexibility, options and opportunities, increase asset value, cashflows and return on investment. New approaches introduced include resource/reserve risk quantification, cost-effective drilling programs, pit design and long-term production scheduling optimization with simulated orebodies, ore reserve classification, geologic risk discounting, waste managing and demand driven scheduling, risk assessment in meeting project production schedules ahead of mining, risk based optimal stope design, options valuation when mining.

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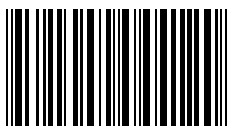
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