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Research on Mechanical Sensitivity Response Prediction of Explosives Based on Machine Learning

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Abstract

In order to reduce the workload and uncertainty of conventional mechanical sensitivity tests of explosives, and to obtain the performance parameters of explosives more quickly and accurately, machine learning methods to predict the response values of explosives mechanical sensitivity is proposed. The dataset is constructed by real test, finite element simulation and Monte Carlo data enhancement. By training and hyperparameter tuning for different classification models, we conclude that BP neural network is the best. The model is tested with real test data, and the results show that it is effective and feasible to predict the response values of mechanical sensitivity. It also provides a good reference for multiple QMU (quantification of margins and uncertainties) reliability evaluation of explosives.

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Indexing

Main heading:

Explosives

Controlled terms:

Forecasting Intelligent systems Machine learning Monte Carlo methods Neural networks

Statistical tests

Uncontrolled terms:

Machine learning methods Machine-learning Mechanical sensitivity On-machines

Performance parameters Quantification of margin and uncertainty evaluation Response prediction

Sensitivity tests Uncertainty Uncertainty evaluation



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922.2 Mathematical Statistics

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