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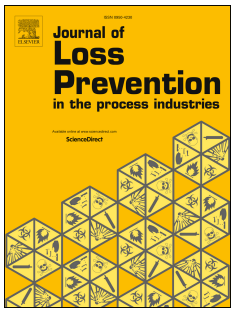

An automatic approach for the control of the airflow volume and concentrations of hazardous gases in coal mine galleries

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An automatic approach for the control of the airflow volume and concentrations of hazardous gases in coal mine galleries

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Abstract: Intelligently controlling ventilation networks after an abnormal air branch is difficult. The key variable-frequency mine ventilator control factors that are used to correct this phenomenon were discussed. To improve the fitting accuracy of the mine ventilator characteristic curves, a database of characteristic curves for mine ventilators operating at different frequencies was established using the interpolation method for optimizing uniform approximations by Chebyshev. The concept of frequency sensitivity analysis by analyzing the sensitive branch in the ventilation network was proposed. The linear function between the mine ventilator working frequency and branch wind quantity was fitted out by experiments. A model based on Tikhonov regularization measured the branch wind quantity to calculate the wind resistance in the ventilation network, which yielded a unique branch resistance model solution. The mine air was monitored by calculating the variable wind resistance from the branch wind quantity. The sensitive branch coupling in the mine ventilator variable-frequency controlled ventilation was analyzed and combined with the control theory for ventilation networks. Two types of variable frequency were controlled to adjust the branch wind quantity, the frequency-concentration (*f-w*) servo control method and the curve search method. The experimental model was established for the Da Liu-ta

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