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## 基于知识元的突发事件风险分析

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## Emergency Risk Analysis based on Knowledge Element

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摘要

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**摘要** 科学地分析突发事件的风险, 有利于应急管理部门正确制定应对方案, 降低事件损失。突发事件风险分析中受到多因素高维数据和小样本数据信息不完备的约束, 无法全面识别突发事件的风险。本文从突发事件系统观点出发, 以知识元模型、投影寻踪方法和信息扩散理论为基础, 提出了基于知识元的突发事件风险分析方法。该方法采用知识元模型描述了突发事件已认知的共性本体特征, 通过探寻事件风险等级标准数据的最佳投影方向降低了输入元素观测数据的维数, 将输入元素观测样本所包含的风险信息扩散到输出属性的风险指标论域的控制点上, 从而确定了突发事件发生的风险概率。实例分析中, 根据国家《地表水环境质量标准 (GB3838-2002)》划分水污染风险等级, 利用某湖泊8个监测点实时检测数据, 分析该湖泊突发水污染事件的风险性。研究表明基于知识元的突发事件风险分析方法能够根据研究区域突发事件风险等级标准和观测点的样本数据, 动态定量的分析和评估突发事件潜在风险, 为突发事件的应急管理提供科学依据。本文提出的突发事件风险方法对于已经建立实时监测系统的危险区域分析突发事件的风险性具有一定的借鉴意义。

**关键词:** 知识元 突发事件 风险分析

**Abstract:** Scientific risk analysis of emergency is helpful to make correct contingency plans for Emergency Management Agency and to reduce event loss. However, most emergency risk analyses are under restrictions of multi factors, high dimensional data, small samples and incomplete information, and cannot fully recognize the risk of an emergency. In emergency system viewpoint and under the assistance of knowledge element model, projection pursuit method and information diffusion theory, a method of emergency risk analysis is developed in this paper based on knowledge element. By making use of the knowledge element model, the common ontological characteristics are described. Reducing dimensionality of the observed data on the input elements through searching for the optimum projection direction of the standard data on emergency risk grade, risk information contained in the observed data of the input elements is diffused into the points of the risk index universe on the output elements, and the emergency risk probability is carried out. Taking a lake as an example, risk of the water pollution is graded according to the national standard of environmental quality for surface water, with the data collected from 8 real-time monitoring sites of the lake. The results show that the emergency risk analysis based on knowledge element could analyze and evaluate potential risk of an emergency according to the risk standard grade and the observed data on site. The model of emergency risk analysis based on knowledge element expands the study of risk analysis and provides a scientific basis for the emergency management. Further, the results will provide references to emergency risk analysis in the dangerous areas where real-time monitoring system has been established.

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