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ABSTRACTS

KINETIC STUDIES OF FERRITISION WASTEWATER TREATMENT FOR INDUSTRIAL FACILITIES

Gennadii Kochetov, Kyiv National University of Construction and Architecture

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Abstract

Considerable attention has been paid recently to the development of comprehensive recycling of industrial wastewater, which provides for an appropriate degree of purification for organization of circulation water supply. The most prospective option for introduction of low-waste wastewater treatment is associated with application the method of ferritisation. The aim of this study is to conduct experimental studies of the basic technological parameters of nickel-containing wastewater treatment and to explore the kinetics of extraction of iron and nickel ions from aqueous solutions by means of ferritization, as well as the techniques of its activation on quality of the comprehensive treatment. Wastewater treatment by ferritisation was study at temperatures 60 – 70 ºC and another one with electromagnetic pulse activation. Concentrations of metal ions were determined by voltamperometry analyser AVA-3. Results of kinetic studies for ferritisation process of concentrated wastewater treatment nickel-containing compounds are presented. Regression model and algorithm for calculation for changes of heavy metals' concentrations in time are proposed. The assessment of adequacy of these models to the experimental data of wastewater treatment at various methods of activation was made. Analysis of the values of residual concentrations of heavy metal ions in purified water indicates that in all ranges of the studied technological parameters and at different ways of activation of the ferritization process, the concentration of this metal was in the range from 0.1 to 0.35 mg/ dm3. Thus, the developed technology provides for application of recycled water supply in production facilities, it will help to prevent environmental pollution by toxic substances, to modernise outdated production processes and equipment. It ensures efficient and rational use of water, raw materials and energy in production processes. Kinetic regularities of removal of nickel and iron ions from aqueous solutions were determined and mathematical dependencies and software for calculation were proposed.

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Conceptual usage model of big data generated by social media

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Abstract

The digital revolution and the communication platforms provided by the web 2.0 virtual space era, such as social media, social networks, other tools and channels, create new opportunities for better marketing decisions based on user-generated data analysis. Every day customers of social media and other virtual tools are creating huge amounts of their actions caused data, and business lack management tools for the support of this process, which could create knowledge in the area of customer profiles and preferences deeper cognition. Growing numbers of social media users indicate the popularity of these communication tools among the information society, but science today lacks a deeper knowledge of social media generated data and other algorithms for this data usage. Therefore, the purpose of the article is defined as the development of the conceptual model of big data generated by social media usage in business. The formation of the conceptual model is based on the analysis of big data assumptions and application possibilities, social media classification peculiarities and different channel specifics, identification of big data analysis methods and analysis of large data applications generated by social media. The conceptual model creates preconditions for deeper knowledge of user-generated big data in nowadays widely used communication platforms, as well as creation of the decision support tool for marketing specialists in order to use big data from social media in deeper customer profile and preferences cognition. Methods employed in this research are: literature and other references analysis, synthesis and logical analysis of information, comparison of information, systemization and visualization.

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A shortest path method

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Abstract

The purpose of this work is to introduce a computer method that draws the shortest path connecting two stationary points on a surface in the space z = f (x, y), and presents the path on the computer screen. This problem could conventionally be performed by solving a system of differential equations of the second order (Euler Lagrange system) with boundary conditions. However, this method is only valid with certain conditions. Firstly, the surface should be uniform. Secondly, the metric corresponding to that surface should not be very sensitive to the change of the initial velocity beam of the above-mentioned differential equations system. Moreover, there are no effective ways of resolving this issue when the surface contains obstacles. The numerical method presented in this project is based on random changes. We adopt a discrete curve on the computer's screen that represents a curve on a surface in the space and passes through two stationary points. We then change the positions of the mentioned points by performing random transitions in all directions, and in all dimensions. We adopt these transitions if they reduce the total energy of the curve. We then repeat this procedure on all curve's points until acquiring a good approximation of the curve representing the shortest route passing through the two stationary points. There are numerous areas of application for this approach; for instance, it can have major beneficial implications in image processing, computer aided manufacturing, decision making, robotics, etc. The approach used in this work is based on fundamental concepts of differential geometry, where intermittent representation is necessary to represent the shapes on the computer screen. This study is basically experimental. An algorithm was written and tested, using a computer program, on various criteria for known geodetic surfaces. The algorithm's results were compared with the results obtained by solving the Euler Lagrange theorem. Moreover, the algorithm was applied on cases of sensitive parameters for the change of the initial velocity beam, and on cases of the obstructed surfaces (Obstacles). The algorithm proved effective throughout all conditions and gave the desired results.

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