SOLUTION OF SELECTED PROBLEMS USING IBM QX

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Abstract: This paper presents a set of works that were chosen to be decomposed to individual algorithms and solved usinga quantum computer, which is available publicly through the IBM QX platform. The objective was to demonstrate a fundamental change in the way of thinking about problems when working with a quantum computer as opposed to solving computational problem on a classical computer. Although a novelty for most people today, the way of approach that is explored in this paper might become a valuable skill one day, when quantum computers become more wide-spread.

Keywords: Quantum Computer; Qubit; IBM QX; Quantum Circuit; Quantum Gate.

TARGET TRACKING BY ADAPTIVE FILTERING

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Abstract: In the field of adaptive radar (tracking) under conditions of interference, techniques such as the extended Kalman filter, particle filtering algorithms, etc., are usually used for state estimate. Many techniques have been developed for more effective target tracking. In this paper, we approach the structure and key features of the proposed adaptive targeting radar and the algorithm of the particle filtering (PF), the Elman NN (neural network) and the Group Methods for Data Processing (GMDP). The adaptive tracking algorithm can solve the question about the accuracy of estimates around probable points. The proposed algorithm was used in adaptive radar especially for monitoring problems with emphasis on backpropagation learning, selection of correct algorithm, decision making based on the situation and storage of information. The simulation results showed that adaptive tracking had a great impact on the accuracy and smartness of tracking compared to common approaches.

Keywords: Target Tracking; Adaptive Radar Data Processing; Kalman filter; Particle filter; Neural Network.

THE CURRENT COMMAND AND CONTROL SYSTEM OF REALIZATION OF ENGINEER SUPPORT TASKS OF TASK FORCE OPERATION

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Abstract: The article deals with the current command and control system of realization of engineer support tasks of task force operation depending on the realized steps within the Army of the Czech Republic transformation in recent years. The aim of the paper is to evaluate the current state of command and control system and identify possible causes contributing to the current situation in this area. To identify crucial causes which have a significant impact on the command and control system of realization of engineer support of operation was used so-called problem tree method.

Keywords: Command and control; System C2; Engineer support.

FEM ANALYSIS OF MOBILE BRIDGE AM-50 AS PER NEEDS OF SLOVAK ARMED FORCES

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Abstract: Mobile bridge AM-50 is most common bridging equipment in Slovak Armed Forces. The main purpose of vehicle like AM-50 is to ensure mobility of heavy equipment over different types of barriers. Main tactical parameter is load capacity expressed in MLC classification of the bridge. Because of these facts, FEM analysis of AM-50 load capacity as per NATO standard is essential. This article is showing detailed description of FEM analysis of AM-50 bridge load capacity in accordance of standard STNAG 2021 and their results.

Keywords: FEM Analysis; AM-50; STANAG 2021; Load capacity; Simulation.

SENSITIVITY ANALYSIS IN RISK ASSESSMENT OF DRINKING WATER CHEMICAL POLLUTION CAUSED BY MILITARY ACTIVITIES

Serhiy **OREL**

Abstract: This paper presents the sensitivity analysis of environmental pollution risk assessment caused by military activities. Using the example of carcinogenic risk assessment of contaminated drinking water consumption, the role of sensitivity analysis for environmental decision-making is shown. Sensitivity analysis is a valuable tool in quantitative risk assessment by determining critical aspects and effects of variations.

TASKS AND ACTIVITIES EXECUTED IN THE FIELD OF THE SUPPORT OF THE STATE DEFENSE

Ján **BREZULA**

Abstract: The defence infrastructure is necessary element of supporting the state defense and it is formed by the services and activities provided to the Slovak Armed Forces for ensuring effective protection and defense of the state. The defense infrastructure consists of lands, buildings and facilities, telecommunication, energy and transport systems, information networks and supplies of state material reserves. An important part of the defense infrastructure is the services and activities provided to the armed forces to ensure the state defense. These services and activities include financial, medical, veterinary, transport, telecommunication, postal, supply, accommodation, research and scientific services, manufacturing, repair and construction activities. This paper deals with the tasks and activities executed in the field of the support of the state defense.