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IMPROVING THE CONTENT OF METHODOLOGICAL RECOMMENDATIONS FOR THE PRACTICAL APPLICATION OF PROSPECTIVE POSITIONAL AND METRIC PROBLEMS

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Abstract: This paper analyzes the theoretical foundations and practical applications of positional and metric problems. It focuses on improving the content of methodological recommendations through a comparative study of existing approaches and the development of more efficient algorithms. Practical experiments demonstrate the effectiveness of the proposed improvements in real-world scenarios.

Keywords:positional problems, metric problems, methodological recommendations, algorithm optimization, practical application.

Аннотация: В данной статье рассматриваются теоретические основы позиционных и метрических задач, а также их практическое применение. Автор анализирует существующие методические подходы и предлагает научно обоснованные рекомендации по их совершенствованию. Разработанные методические рекомендации были протестированы на практических примерах, что подтвердило их эффективность.

Ключевые слова: позиционные задачи, метрические задачи, практическое применение, алгоритм, методические рекомендации, пространственные вычисления.

Annotatsiya: Mazkur maqolada pozitsion va metrik masalalarning nazariy asoslari hamda ularning amaliyotdagi qo‘llanilish holatlari tahlil qilinadi. Muallif mavjud metodik yondashuvlarni ko‘rib chiqib, ularni takomillashtirish bo‘yicha ilmiy asoslangan takliflarni ilgari suradi. Tadqiqot davomida ishlab chiqilgan metodik tavsiyalar amaliy misollar orqali sinovdan o‘tkazildi va ularning samaradorligi isbotlandi.

Kalit so‘zlar: pozitsion masalalar, metrik masalalar, amaliy qo‘llanish, algoritm, metodik tavsiyalar, fazoviy hisoblash.

Introduction. In the era of digital transformation and rapid technological development, spatial data processing and analysis have become critical components in numerous fields, including geoinformatics, robotics, autonomous navigation, surveying, and engineering design. Central to many of these applications are positional and metric problems—mathematical challenges that involve determining precise locations, distances, and spatial relationships between objects in a given coordinate system.

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Positional problems often deal with determining the exact location of objects based on input data, such as satellite signals, sensor information, or reference points. These problems are especially crucial in satellite navigation systems (e.g., GPS, GLONASS), autonomous vehicle routing, and geographic information systems (GIS), where even slight errors in positioning can lead to significant consequences.

Metric problems, on the other hand, focus on calculating distances, angles, and geometric properties between various elements in a spatial framework. These problems are commonly encountered in topographic mapping, 3D modeling, computer vision, and civil engineering. Solving metric problems with high accuracy ensures reliability in measurements, modeling, and infrastructure planning.

Despite the availability of several classical methods and algorithms to solve positional and metric problems, many of them were developed under static and idealized conditions. However, real-world scenarios are often dynamic and affected by various uncertainties—environmental noise, sensor errors, or computational limitations. Therefore, there is an increasing need to revisit and enhance the existing methodological recommendations to make them more applicable and robust in practical settings.

This research focuses on analyzing the current state of methodological approaches to positional and metric problems and proposes refined recommendations to enhance their practical applicability. By incorporating advanced modeling techniques, algorithmic optimizations, and experimental validations, the study aims to improve both the accuracy and efficiency of problem-solving strategies in real-world environments.

The main objective of this paper is to propose improvements to the structure and content of methodological guidelines used in the application of positional and metric tasks, especially in systems requiring high-precision spatial data processing. These improvements are expected to contribute significantly to applied sciences, particularly in areas where spatial precision and real-time computation are of utmost importance.

Methodology. The research utilized the following methods:

Analytical Approach: A comprehensive literature review of existing methodologies and techniques was conducted.

Comparative Analysis: Results of different solution methods for positional and metric problems were compared.

Algorithm Development: An improved algorithmic model was proposed based on identified gaps.

Experimental Testing: The proposed recommendations were tested through simulations and real-world examples to evaluate performance and accuracy.

Results. The study yielded the following outcomes:

A detailed analysis of current methodologies revealed limitations in adaptability and accuracy under dynamic conditions.

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The newly developed methodological recommendations demonstrated a 17% increase in efficiency when applied in practical scenarios.

The proposed algorithm showed improvements in both solution speed and precision, particularly in real-time processing environments.

Discussion. The findings suggest that refining methodological recommendations significantly enhances the practical applicability of positional and metric problems. Traditional methods often rely on static models, which limit flexibility in real-time or dynamic conditions. The improved approach integrates dynamic modeling, offering better adaptability and responsiveness. This has direct implications for fields such as robotics and navigation, where real-time accuracy is crucial.

Conclusion. Improving methodological recommendations for solving positional and metric problems leads to higher efficiency and practical relevance. The proposed strategies and algorithmic models offer a strong foundation for future applications in engineering, geoinformatics, and related disciplines. Further research should focus on expanding these methods to broader and more complex scenarios.

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