UAEU and Georgia: A Comparative Analysis of Scientific Landscapes, Recent Publications, and Algorithms Based on Fast Fourier Transforms

Part 1. General Overview of the Development of Science and Education at the United Arab Emirates University (UAEU) and Its Comparison with the System in Georgia

The United Arab Emirates University (UAEU) is recognized as the flagship university of the UAE, established in 1976. It functions as the country's premier academic and scientific institution, with its primary mission being the provision of high-quality education and the conduct of world-class research. In recent years, UAEU has significantly expanded its scientific infrastructure, enhanced its research laboratories, and substantially increased funding for scientific projects. The university places a strong emphasis on interdisciplinary research and maintains close ties with industry, which further amplifies the practical significance of its scientific outcomes.

The system of higher education and science in Georgia is also undergoing important stages of development, although it sometimes lacks the scale of technological and financial support observed at UAEU. Nevertheless, Georgia's scientific community possesses a solid theoretical foundation, highly qualified researchers, and traditionally strong schools in mathematics, physics, and natural sciences. Additionally, in Georgia, a significant portion of research projects is supported through international grants, whereas UAEU has managed to develop major scientific programs through substantial internal funding.

Part 2. General Overview of My Publications in 2024–2025

Part 3. Development of Algorithms Using Fast Fourier Transforms and Some of Their Applications

In recent years, my research interests have focused on developing efficient algorithms based on the Fast Fourier Transform (FFT). In particular, several modified schemes have been proposed that combine matrix forms of Walsh–Hadamard transforms to enable rapid

formulation and solution of differential equations.

The main objective is to collaborate with colleagues at the Institute of Applied Mathematics to investigate well-known and previously solved differential equation problems using various numerical methods and to compare these solutions with those obtained through FFT and Hadamard matrix techniques. This approach, on the one hand, reduces computational complexity to O(n log n) and, on the other hand, provides new insights into the spectral structure of solutions. Future work includes adapting these algorithms to specific model problems and assessing their effectiveness relative to traditional methods.