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Mathematical Modelling of Engineering and Biological Systems: A Pathway to Technological Innovation and Sustainable Development

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Abstract: Mathematical modelling of engineering and biological systems plays a vital role in fostering national development and driving technological innovation. By constructing precise computational representations of complex systems, researchers and engineers can predict behaviours, optimize processes, and develop cutting-edge solutions that stimulate economic progress and improve quality of life. In engineering, such models aid in designing more efficient, sustainable systems for infrastructure, transportation, and energy. In the biological sciences, they offer deeper insights into physiological mechanisms and epidemiological patterns, supporting advancements in healthcare, agriculture, and environmental sustainability. The interdisciplinary nature of mathematical modelling promotes collaboration, accelerates innovation, and strengthens a nation' s leadership in science and economic competitiveness. This presentation will explore the broad applications of mathematical modelling, highlighting innovative approaches to challenges such as thermal regulation in engineering devices through nanofluid dynamics, physiological flow analysis, cardiovascular disease prevention, and the cost-effective management of ecological and epidemiological issues affecting both humans and plants.
Keywords: Mathematical Modelling; Engineering Cooling; Tissue Thermoregulation; Ecological and Epidemiological Problems.

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