

Ph.D. DISSERTATION INFORMATION

The Ph.D. Dissertation title **“RESEARCH TO ENHANCE PRODUCT QUALITY OF FDM TECHNOLOGY”**

Specialty: Mechanical Engineering

Code: 62520103

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SUMMARY OF KEY POINTS OF THE THESIS

FDM (Fused Deposition Modeling) technology occupies a large market share among AM (Additive Manufacturing) technologies due to advantages such as using common materials, not using laser or UV energy, so FDM equipment has simple structure, easy to control, easy to operate, low investment and maintenance cost. However, in order to create products with high quality requirements, for example in the industrial field, this technology needs to be improved in quality characteristics such as: dimensional accuracy, surface roughness, mechanical properties... These properties are mainly influenced by technological parameters during product creation. In this direction, the thesis focuses on understanding the manufacturing process of FDM products by controlling relevant technological parameters to improve the dimensional accuracy and tensile strength of the products.

To improve the dimensional accuracy and tensile strength, the thesis has built a process to control technological parameters through the experimental process based on the central composite design method (Face - Centered Central Composite Design - FCCCD). Using the method of analysis of variance (Analysis of Variance - ANOVA) to analyze the suitability of the model and the statistical significance of each technological parameter. In addition, the thesis also uses the objective function optimization algorithm by the RSM method (Response Surface Design) to find the values of each technological parameter for the proposed goal. Experimental results according to the RSM method have evaluated the influence of technological parameters on the output goals: dimensional accuracy and tensile strength of FDM products. At the same time, optimal parameter sets for dimensional accuracy, tensile strength, and multi-objective optimal parameters were identified for both dimensional accuracy and tensile strength.