광폭자수기 가터샤프트의 단면형상 최적화

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Shape Optimization for Cross-section of Gatter Shaft of Shuttle Embroidery Machine

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Key Words: Shape Optimization, FEM, Statistical Design Support System, Shuttle Embroidery Machine

Abstract : In order to improve the productivity and quality of shuttle embroidery machine, gatter shaft to fixes and transfer cloth must be transferred with high speed and keep accurate transfer distance. However, if the gatter shaft is transferred with high speed, gatter shaft is easy to deform and a heavy load occur in shuttle embroidery machine because it has about 15m width and 1ton weight. Therefore, in this study, optimized shape of gatter shaft was drew using finite element method(FEM) and Statistical Design Support System(SDSS) for weight and bending stiffness.

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Ground-Structure-Based Compliant Mechanism Design by Using Joint Variable Method

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Key Words: Topology optimization(위상 최적화), Ground structure(그라운드 스트럭처), Joint effect(조인트 효과)

Abstract : Typically, the continuum-based topology optimization employing the SIMP technique has been employed to create efficient compliant mechanisms. Its disadvantages are, however, that the resulting topologies are generally complex, and often suffer from numerical problems such as checkerboard pattern and gray image. Even if high order elements are used, interpretation around hinges is quite confusing. In this research, we propose to use a ground-structure-based method to simplify the resulting shapes. Also, unlike the existing methods, joints that are regarded to have finite stiffness are used as the design variables for optimization. Thus, the objective of this research is to formulate a new topology optimization method to design manufacturable compliant mechanisms having distinct joint informations.