

## DESIGN OF A FRAME OF INLINE SKATES MADE BY ADDITIVE TECHNOLOGY

### Authors:

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### Abstract:

*The aim of the article was to investigate the possibility of topological optimization (TO) of the inline skate frame manufactured through the Powder Bed Fusion (PBF) method of AISi10Mg-0403, an Additive Manufacturing (AM) technique. The study's core objective was to leverage The Altair Inspire software to re-envision the initial CAD model, culminating in an organic and bionic frame design. Incorporating comprehensive load analysis, the research considered various load scenarios, including static mass, dynamic forces, and acceleration during cornering, to ascertain the frame's strength and stability. Topological optimization was excluded within a defined design space, preserving critical functional elements while enhancing performance. The first part of the article is devoted to defining the concepts and nature of AM metallic materials. The practical part follows, in which the design of the skate frame is specified with specific requirements and the procedure of individual steps needed to create its final CAD Model. The work concludes by describing the preparation of the designed optimized frame construction.*

### Keywords:

Topology Optimization; Mechanical Engineering Design; Frame; Inline Skates; Additive Manufacturing; Powder Bed Fusion