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Abstract: Additive Manufacturing techniques such as Selective Laser Melting (SLM) are highly suitable for producing lattice structures with complex unit cell designs. These structures can be designed and build in such a way that their properties match the needs for both medical and structural parts. This paper presents a novel local stress method for fatigue analysis of such SLM lattice structures. The fatigue performance of Ti6Al4V, CoCr and NiTi structures is assessed with this method. In addition, successful life-prolonging post-SLM heat and surface treatments are developed. The resulting methods and treatments can be extended to other types of AM structures.

Advanced fatigue analysis of metal lattice structures produced by Selective Laser Melting

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