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Design and optimisation of lattice structures for aerospace applications

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Colophon

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Extensively present in nature (e.g., bone-microstructure or birds beak), their research interest came thanks to the observation that the stiffness of optimal structures spans multiple scales [1, 2]. In addition to that, Fleck observed that [3] "*one reason for such structural hierarchy in engineering structures is to increase buckling strength: recall that the buckling strength scales with any representative strut length l according to l^{-2}, and so the finer the length scale, the higher the buckling strength.*"

1. Kohn et al. (1986), 'Optimal design and relaxation of variational problems'

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[2] Allaire, G. and Aubry, S., 'On optimal microstructures for a plane shape optimization problem', *Structural optimization* 17.2 (Apr. 1999), pp. 86–94.
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[3] Fleck, N. A., Deshpande, V. S., and Ashby, M. F., 'Micro-architectured materials: past, present and future', *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* 466.2121 (Sept. 2010), Publisher: Royal Society, pp. 2495–2516.
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Appendix

Geometry generation for ultra-light structures

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