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	Sommario/riassunto	This study aid on numerical optimization techniques is intended for university undergraduate and postgraduate mechanical engineering students. Optimization procedures are becoming more and more important for lightweight design, where weight reduction can, for example in the case of automotive or aerospace industry, lead to lower fuel consumption and a corresponding reduction in operational costs as well as beneficial effects on the environment. Based on the free computer algebra system Maxima, the authors present procedures for numerically solving problems in engineering mathematics as well as applications taken from traditional courses on the strength of materials. The mechanical theories focus on the typical one-dimensional structural elements, i.e., springs, bars, and Euler–Bernoulli

beams, in order to reduce the complexity of the numerical framework and limit the resulting design to a low number of variables. The use of a computer algebra system and the incorporated functions, e.g., for derivatives or equation solving, allows a greater focus on the methodology of the optimization methods and not on standard procedures. The book also provides numerous examples, including some that can be solved using a graphical approach to help readers gain a better understanding of the computer implementation.