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Designing Physics Problems with *Mathematica* Example I

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We envision utilizing the versatility of a Computer Algebra System, specifically *Mathematica* to explore designing physics problems. As a focused project we consider for instance a thermo-mechanical-physics problem showing its developmental from the ground up. In accordance with the objectives of this investigation first by applying the fundamentals of physics principles we solve the problem symbolically. Applying the solution we investigate the sensitivities of the quantities of interest for various scenarios generating feasible numeric parameters. Although a physics problem is investigated, the proposed methodology may as well be applied to other scientific fields. The codes needed for this particular project are included enabling the interested reader to duplicate the results, extend and modify them as needed to exploring various extended scenarios.

Keywords. Thermo-Mechanical Physics, Designing Physics Problems, Computer Algebra System, *Mathematica*