

Abstract Submitted  
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**Jacobi Elliptic Functions and their Application in Classical Mechanics, Superconductivity and Magnetism**<sup>1</sup> THOMAS E. BAKER, OVIDIU E. ICREVERZI, ANDREAS BILL, California State University Long Beach — A differential equation involving a third or fourth degree polynomial may be rewritten in terms of one of three elliptic integrals. These integrals can be inverted to define the Jacobi Elliptic Functions. An application of these functions is to solve non-linear second order differential equations involving circular trigonometric functions sine and cosine. We present solutions of problems in three different areas of physics that have similar Lagrangian and associated Euler-Lagrange equations: the bead on a hoop, the Usadel equation of a dirty superconductor and the magnetization twist in a single magnetic layer. We discuss what type of solutions are obtained for these problems and how they relate to each other.

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