1003-49-1069   **Bogdana A Georgieva*** (`bogdana@pacificu.edu`), Mathematics Department, Pacific University, Forest Grove, OR 97116, and **Ronald Guenther** (`guenth@math.orst.edu`), Mathematics Department, Oregon State University, Corvallis, OR 97331. *Generalized variational principle. First Noether-type theorem.*

As is known, a variational description of a system is very desirable both from mathematical and physical points of view. Recently, Herglotz formulated a variational principle which is more general than the classical variational principle and contains the classical variational principle as a special case. In the Herglotz principle the functional, whose extrema are sought, is defined by a differential equation instead of by an integral. This variational principle is important for a number of reasons. It is closely related to contact transformations and can give a variational description of non-conservative processes when such a description is not possible with the classical variational principle. We give examples for new applications to nonconservative processes in mechanics, to the nonlinear damped Klein-Gordon equation, and to the propagation of electromagnetic waves in conductive medium. We formulated and proved a theorem which provides the conservation laws corresponding to an invariance of the functional, defined by the Herglotz variational principle, under a n-parameter group of transformations. This theorem contains the classical first Noether theorem as a special case. (Received October 03, 2004)