Estimates of the distance to minimizers of nonlinear variational problems and applications to numerical analysis.

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We discuss a mathematical approach that generates estimates of the distance between an arbitrary function in the space of energy admissible functions associated with a variational problem and the corresponding minimizer. The estimates depend on this function and problem data and do not explicitly use the minimizer. Moreover, we also find correct error measures natural for a particular class of problems. The approach can be used not only for numerical approximations but also for getting computable errors arising due to penalization and regularization. Also, we discuss a generalization of the Helmgholtz decomposition theorem associated with nonlinear differential operators.