

Variational approach for a nonlinear elliptic
eigenvalue problem in Musielak-Orlicz spaces,
concave - convex case

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We discuss the eigenvalue problem for a nonlinear elliptic equation of the form:

$$-Ax = -\lambda H_x(x) + Q_x(x) \tag{1}$$

where A is a nonlinear operator in a generalized modular space; H and Q are convex functionals. We derive a new variational methodology based on the Fenchel-Young conjugacy to prove the existence of solutions. Next, we apply the abstract result to a degenerate nonlinear elliptic eigenvalue problem in Musielak-Orlicz spaces.