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Existence of solutions for a singular double phase variable exponent problem with $(p(\cdot), q(\cdot))-$ Hardy-type potential

In this work, we study a singular double phase variable exponent problem with $(p(\cdot), q(\cdot))-$ Hardy-type potential. We establish existence results using variational methods and critical point theory adapted to the non-standard growth setting, addressing the technical difficulties arising from the lack of homogeneity, the singular nature of Hardy potentials, and the interplay between variable exponents and phase transitions.

Keywords. Singularity; variable exponent; variational approach; critical point theory; Hardy-type potential; double phase operator.