

N -LAPLACIAN PROBLEMS
WITH CRITICAL TRUDINGER-MOSER NONLINEARITIES

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We prove existence and multiplicity results for an N -Laplacian problem with a critical exponential nonlinearity that is a natural analog of the Brezis–Nirenberg problem for the borderline case of the Sobolev inequality. This extends results in the literature for the semilinear case $N = 2$ to all $N \geq 2$.

When $N > 2$ the nonlinear operator $-\Delta_N$ has no linear eigenspaces and hence this extension requires new abstract critical point theorems that are not based on linear subspaces.

We prove new abstract results based on the Z_2 -cohomological index and a related pseudo-index that are applicable here.