Existence, nonexistence, and asymptotic behavior of solutions for N-Laplacian equations involving critical exponential growth in the whole $\mathbb{R}^N$

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We are interested in studying the existence or non-existence of solutions for a class of elliptic problems involving the N-Laplacian operator in the whole space. The nonlinearity considered involves critical Trudinger-Moser growth. Our approach is non-variational, and in this way, we can address a wide range of problems not yet contained in the literature. Even $W^{1,N}(\mathbb{R}^N) \hookrightarrow L^\infty(\mathbb{R}^N)$ failing, we establish $\|u\|_{L^\infty(\mathbb{R}^N)} \leq C\|u\|_{W^{1,N}(\mathbb{R}^N)}^\Theta$ (for some $\Theta > 0$), when u is a solution. To conclude, we explore some asymptotic properties.