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### **Existence of Solutions for a Nonlocal Variational Problem in $\mathbb{R}^2$ with Exponential Critical Growth**

We study the existence of nontrivial solutions for the following class of nonlocal problem,

$$-\Delta u + V(x)u = \left( I_\mu * F(x, u) \right) f(x, u) \quad \text{in } \mathbb{R}^2,$$

where  $V$  is a positive periodic potential,  $I_\mu = \frac{1}{|x|^\mu}$ ,  $0 < \mu < 2$  and  $F(x, s)$  is the primitive function of  $f(x, s)$  in the variable  $s$ . By assuming that the nonlinearity  $f(x, s)$  has an exponential critical growth at infinity, we prove the existence of solutions by variational methods.

**Keywords:** Nonlocal nonlinearities, exponential critical growth, ground state solution.

**MSC:** 35J50, 35J60, 35A15