On a class of Hamiltonian Choquard-type elliptic systems

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Abstract. This work is concerned with the existence of solutions for a class of Hamiltonian Choquard-type elliptic systems of the form

$$\begin{cases} -\Delta u + V(x)u = \left(\frac{1}{|x|^{\mu}} * G(v)\right) g(v) \text{ in } \mathbb{R}^2, \\ -\Delta v + V(x)v = \left(\frac{1}{|x|^{\mu}} * F(u)\right) f(u) \text{ in } \mathbb{R}^2, \end{cases}$$

where $0 < \mu < 2$, V is a potential that may change sign, the nonlinear terms f and g have exponential critical growth, $F(t) = \int_0^t F(\tau)d\tau$, and $G(t) = \int_0^t G(\tau)d\tau$. Typical features of this class of problems are a lack of compactness because of the unboundedness of the domain and that the critical growth and the energy functional associated with this class of systems are strongly indefinite, that is, the domain has a saddle-point geometry where both positive and negative subspaces of the quadratic form are infinite-dimensional. Moreover, the presence of the nonlocal term in the nonlinearity provides a series of difficulties in obtaining certain estimates. The research was conducted jointly with Bráulio B.V. Maia-UFRA.