

**COERCIVITY FOR TRAVELLING WAVES
IN THE GROSS–PITAEVSKII EQUATION IN \mathbb{R}^2
FOR SMALL SPEED**

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Abstract: In a previous paper, we constructed a smooth branch of travelling waves for the 2-dimensional Gross–Pitaevskii equation. Here, we continue the study of this branch. We show some coercivity results, and we deduce from them the kernel of the linearized operator, a spectral stability result, as well as a uniqueness result in the energy space. In particular, our result proves the nondegeneracy of these travelling waves, which is a key step in their classification and for the construction of multi-travelling waves.

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Key words: travelling waves, coercivity, local uniqueness.