

## Perfect square in the HFB norm overlap functions

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### Abstract

The mathematical structure of the Onishi formula for the HFB norm overlap functions [1] is discussed from a viewpoint of the “perfect square”. The perfect square here means a kind of polynomials consisting of the Bogoliubov matrix elements. Based on the mathematical analysis, the long-standing “sign problem” associated with the square root in the Onishi formula is considered in comparison with the other formulae, such as the Neergård-Wüst formula [2] and Robledo’s Pfaffian formula [3]. A new formula, which is free of the sign problem is also presented, which can be the most efficient computational method in numerical applications.

### References

- [1] N. Onishi and S. Yoshida, *Nucl. Phys.* **80** (1966) 367.
- [2] K. Neergård and E. Wüst, *Nucl. Phys. A* **402** (1983) 311.
- [3] L. M. Robledo, *Phys. Rev. C* **79** (2009) 021302(R).