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Construction of a unique metric in quasi-Hermitian quantum mechanics (erratum)

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In our recent short communication [1] we discussed the ambiguity of the physical metric $\Theta = \Theta^\dagger > 0$ assigned to a given $\mathcal{PT}-$symmetric Hamiltonian H. For the sake of simplicity we adopted a specific overall scale factor $Z = 1$ for Θ. We emphasized that in the resulting one-parametric subfamily of Θ the factorization $\Theta = \mathcal{CP}$ produces a charge factor $\mathcal{C}$ which is not involutive.

In order to avoid possible misunderstanding we would like to point out that neither the involutivity $\mathcal{C}^2 = I$, nor the choice $Z = 1$, is based on any deeper physical reasoning. In this sense, the statements formulated in the last four lines of paragraph 3.2 of ref. [1] (together with several references to them throughout the text) should accordingly be interpreted with due care.

In particular, it is clear that, whenever required, one can always return to the full, two-parametric family of Θ and achieve the involutivity of the charge $\mathcal{C}$ via an elementary Hamiltonian-dependent adaptation of a scale-factor $Z \neq 1$.

Acknowledgement

Participation of MZ partially supported by the University of Stellenbosch, by the MŠMT "Doppler Institute" project Nr. LC06002 and by the Institutional Research Plan AV0Z10480505.

References

[1] M. Znojil and H. B. Geyer, Phys. Lett. B 640 (2006) 52.