

Erratum

**Adiabatic Theorems and Applications
to the Quantum Hall Effect[★]**

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Received February 8, 1993; in revised form March 22, 1993

Commun. Math. Phys. **110**, 33–49 (1987)

After half a decade since the appearance of our article [1] we still regularly receive questions and remarks about some formulas and expressions in text. Furthermore Dr. M. Hübner (Leipzig) points out that some term in Eqs. (2.12), (2.14), (2.16) vanishes. So we write this erratum:

1. On p. 37 in the formula just after Eq. (1.3) there is a minus sign missing:

$$H_A(s, P) = + (i/\tau) [\partial_s U_A(s; s', P)] U_A^*(s; s', P)|_{s=s'};$$

the last term in this expression is, of course, one.

2. On p. 37 last line: There is a minus sign missing; the formula should read

$$H'(s) [H(s) + i]^{-1} = - [H(s) + i] \partial_s [H(s) + i]^{-1}.$$

3. Part (b) of Theorem 2.4 should read: For all $j \in \mathcal{N}$,

$$\begin{aligned} \Omega_{2j-1}(s) &= O(1/\tau^j), & \Omega_{2j}(s) &= O(1/\tau^j), \\ R_{2j-1}(s) &= O(1/\tau^j), & R_{2j}(s) &= O(1/\tau^j), \end{aligned} \tag{2.8}$$

where

$$R_n(s) := \Omega(s) - \sum_{j=0}^{n-1} \Omega_j(s).$$

All bounds are uniform in s .

4. Formula (2.10) should read:

$$\Omega_1(s) = -(i/\tau) U_A^*(s) \widetilde{P}'(s) U_A(s)|_0^s + O(1/\tau^2), \tag{2.10a}$$

$$\begin{aligned} \Omega_2(s) &= (i/\tau) \int_0^s U_A^*(t) [P'(t), P(t)] (\widetilde{P}'(t) U_A(t) - U_A(t) \widetilde{P}'(0)) dt \\ &+ O(1/\tau^2). \end{aligned} \tag{2.10b}$$

[★] We thank K. Jung for his help in preparing this note

5. The last terms in Eqs. (2.12), (2.14) and (2.16) are zero because P' and \tilde{X} map *range* P to *range* $Q := 1 - P$ and vice versa. The formulas read

$$\int_0^t QU_A^*(s)X(s)U_A(s)PY(s)ds = (i/\tau) \left[QU_A^*(s)\tilde{X}(s)U_A(s)PY(s)|_0^t - \int_0^t QU_A^*(s)\tilde{X}'(s)U_A(s)PY(s)ds - \int_0^t QU_A^*(s)\tilde{X}(s)U_A(s)PY'(s)ds \right], \quad (2.12)$$

$$Q(s)X(s)P(s) = -Q(s)[H_A(s), \tilde{X}(s)]P(s), \quad (2.14)$$

$$\begin{aligned} QU_A^*(s)X(s)U_A(s)P &= (i/\tau)Q(U_A^*(s)\tilde{X}(s)U_A(s) \\ &\quad + U_A^*(s)\tilde{X}(s)U_A'(s))P \\ &= (i/\tau)[Q(U_A^*(s)\tilde{X}(s)U_A(s))'P \\ &\quad - QU_A^*(s)\tilde{X}'(s)U_A(s)P]. \end{aligned} \quad (2.16)$$

6. The proof of Lemma 2.7 is wrong. It is corrected in the appendix of [2]:

1. Avron, J.E., Seiler, R., Yaffe, L.G.: Adiabatic theorems and applications to the quantum Hall effect. *Commun. Math. Phys.* **110**, 33–49 (1987)
2. Klein, M., Seiler, R.: Power-law corrections to the Kubo formula vanish in quantum Hall systems. *Commun. Math. Phys.* **128**, 141–160 (1990)

Communicated by A. Jaffe