

Mahn-Soo Choi (Korea University)

Errata: A Quantum Computation Workbook

August 31, 2022

Contents

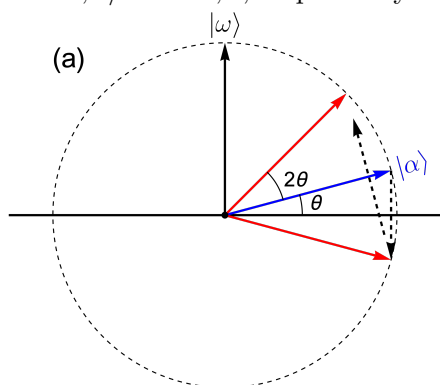
4	Quantum Algorithms	2
5	Quantum Decoherence	3
6	Quantum Error-Correction Codes	5
A	Linear Algebra	6
B	Superoperators	7

Chapter 4

Quantum Algorithms

Fig. 4.4b “... with respect to ω ...” \rightarrow “... with respect to $|v\rangle$...”

Fig. 4.5a $\theta, \theta/2 \rightarrow 2\theta, \theta$, respectively. Here is the correct figure for Fig. 4.5a:



Below Eq. (4.64) on page 161 “... performing the transformation \hat{U} repeatedly depending on the value y on the native register.” \rightarrow “... performing the transformation \hat{U} repeatedly depending on value x on the native register.”

Problem 4.1 (a) “Classically (...), ...” \rightarrow “Show that classically (...), ...”.

Chapter 5

Quantum Decoherence

Section 5.1 In several places, “Zender” must be corrected to “Zehnder”.

Section 5.1, p.191, the last line “In the blue arm, photon passes through ...”
→ “In the red arm, photon passes through ...”.

Section 5.1, p.194, below Eq. (5.6) “Whence the photon detection probabilities ...” → “Hence the photon detection probabilities...”.

Section 5.3, p.216, line 8 “...probabilities $\mathcal{F}_m(\hat{\rho})$ ” must reads as “...probabilities $\text{Tr } \mathcal{F}_m(\hat{\rho})$ ”.

Section 5.4, Eq. (5.99) It should read as

$$\hat{G} = \frac{1}{2} \sum_{\mu>0} \hat{L}_{\mu}^{\dagger} \hat{L}_{\mu} .$$

Section 5.4, Eq. (5.147) It should read as

$$\frac{d\hat{\rho}}{dt} = \dots .$$

Section 5.5, the first sentence, p. 234 “..., who close (or different) ...” → “..., how close (or different) ...”.

Section 5.5.2, p. 236, just below Eq. (5.164) “... the canonical norm associate with ...” → “... the canonical norm associated with ...”.

Section 5.5.2, p. 237, just below Eq. (5.177) “... traceless Hermitian operators (a_0) ...” → “... traceless Hermitian operators ($a_0 = 0$) ...”.

Section 5.5.3, p. 244, the first line “associate with a POVM ...” → “associated with a POVM ...”.

Section 5.5.4, p. 247, below Eq. (5.209) “... of two vectors normalized vectors ...” → “... of two normalized vectors ...”.

Section 5.5.4, p. 248, below Eq. (5.215) “... to note that $\hat{\rho}$ as two eigenvalues ...” \rightarrow “... to note that $\hat{\rho}$ has two eigenvalues ...”.

Chapter 6

Quantum Error-Correction Codes

Section 6.4, p. 298, above Eq. (6.101) “whence” \rightarrow “hence”.

Appendix A

Linear Algebra

Appendix A.1.2, p. 351, above Eq. (A.5) “Whence u is orthogonal ...” \rightarrow “Hence u is orthogonal ...”.

Appendix A.4.1, p. 364, above Eq. (A.55) “Whence, $\hat{A} \geq 0$.” \rightarrow “Hence, $\hat{A} \geq 0$.”

Appendix B

Superoperators

Appendix B.2.3 between **Eqs. (B.30) and (B.31)** $\{v_j\} \rightarrow \{|v_j\rangle\}$ and $|w_k\rangle \rightarrow \{|w_k\rangle\}$

Eq. (B.56) $|\Psi\rangle\langle\Psi|$ should be replaced by $|\Phi\rangle\langle\Phi|$.

Appendix B.4, p. 393, the second last line “Whence, transposition ...” \rightarrow “Hence, transposition ...”.