Erratum: Multipartite-entanglement monotones and polynomial invariants [Phys. Rev. A 85, 022301 (2012)]

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The two-column equation following Eq. (2) of our article is incorrect and, therefore, the proof of Theorem 1 is not complete. However, we emphasize that the theorem is valid. In the following we present a correct proof.

We first note that by factoring out ab in the first term in Eq. (2) and $\sqrt{(1-a^2)(1-b^2)}$ in the second term, the inequality can be written as

$$f_\eta(a,b,x) + f_\eta(\sqrt{1-a^2},\sqrt{1-b^2},x) \leqslant 1,$$

where

$$f_\eta(\alpha,\beta,x) = \alpha\beta\left[\frac{\alpha\beta}{x\alpha^2+(1-x)\beta^2}\right]^{\frac{\eta}{2}-1}.$$

Now for $a,b \neq 0,1$, for both terms the base of the exponential in $f_\eta(\alpha,\beta,x)$ is positive. Since the exponential function for positive bases is always convex, it follows that

$$f_\eta(\alpha,\beta,x) \leqslant \left(1-\frac{\eta}{4}\right) f_0(\alpha,\beta,x) + \frac{\eta}{4} f_4(\alpha,\beta,x).$$

Therefore, if Eq. (2) is true for both $\eta = 0$ and $\eta = 4$, it holds also for all values $0 < \eta < 4$. For $\eta = 0$, a straightforward calculation shows that the sum in Eq. (2) gives exactly 1, and for $\eta = 4$, the inequality was proved by Wong and Christensen in Ref. [1], which concludes our proof for $a,b \neq 0,1$.

In order to treat the cases where one of the parameters a or b equals 0 or 1, we note that $f_\eta(\alpha,\beta,x)$ continuously goes to zero if only one of α or β goes to zero (and, of course, is also continuous at $\alpha = 1$ or $\beta = 1$). Therefore the inequality still holds in this limit. Note that this also covers the cases $a = 0$, $b = 1$ and $a = 1$, $b = 0$.

The only remaining cases are $a = b = 0$ and $a = b = 1$ so that Eq. (2) is not well defined. But then the POVM reduces to a unitary transformation for which the function μ is constant by definition.

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[1] A. Wong and N. Christensen, Phys. Rev. A **63**, 044301 (2001).

