Erratum: Three-quark exchange operators, crossing matrices and Fierz transformations in SU(2) and SU(3) [J. Math. Phys. 42, 991 (2001)]

V. Dmitrašinović

Citation: Journal of Mathematical Physics **45**, 2988 (2004); doi: 10.1063/1.1763248
View online: https://doi.org/10.1063/1.1763248
View Table of Contents: http://aip.scitation.org/toc/jmp/45/7
Published by the American Institute of Physics

Erratum: Three-quark exchange operators, crossing matrices and Fierz transformations in SU(2) and SU(3) [J. Math. Phys. 42, 991 (2001)]

V. Dmitrašinović
Vinča Institute of Nuclear Sciences, (lab 010), P.O. Box 522, 11001 Belgrad, Serbia

(Received 23 March 2004; published online 14 June 2004)

[DOI: 10.1063/1.1763248]

Errors have propagated into several related/equivalent formulas in Ref. 1 as a consequence of one fundamental minus sign error:

(1) The right-hand sides of Eqs. (15a) and (15b) have been erroneously shown as copies of Eqs. (14a) and (14b). The correct form is

$$\mathrm{P}_{123}\sum_{i<j}^{3}\boldsymbol{\lambda}_i\cdot\boldsymbol{\lambda}_j=\frac{16}{9}+\frac{2}{3}\sum_{i<j}^{3}\boldsymbol{\lambda}_i\cdot\boldsymbol{\lambda}_j-\frac{1}{2}d^{abc}\boldsymbol{\lambda}_1^a\boldsymbol{\lambda}_2^b\boldsymbol{\lambda}_3^c-\frac{i}{2}f^{abc}\boldsymbol{\lambda}_1^a\boldsymbol{\lambda}_2^b\boldsymbol{\lambda}_3^c,$$

$$\mathrm{P}_{132}\sum_{i<j}^{3}\boldsymbol{\lambda}_i\cdot\boldsymbol{\lambda}_j=\frac{16}{9}+\frac{2}{3}\sum_{i<j}^{3}\boldsymbol{\lambda}_i\cdot\boldsymbol{\lambda}_j-\frac{1}{2}d^{abc}\boldsymbol{\lambda}_1^a\boldsymbol{\lambda}_2^b\boldsymbol{\lambda}_3^c+\frac{1}{2}if^{abc}\boldsymbol{\lambda}_1^a\boldsymbol{\lambda}_2^b\boldsymbol{\lambda}_3^c.$$

(2) The second row, fourth column entries in the SU(3) crossing matrices C, Eq. (17) and C^2, Eq. (18) should switch signs, i.e., $\pm 1/2\rightarrow\mp 1/2$, or explicitly

$$\mathbf{C}=\begin{pmatrix}\frac{1}{9} & \frac{1}{6} & \frac{1}{4} & \frac{1}{4}\\ \frac{16}{9} & \frac{2}{3} & -\frac{1}{2} & -\frac{1}{2}\\ \frac{80}{81} & -\frac{5}{27} & \frac{13}{18} & -\frac{5}{18}\\ -\frac{16}{9} & \frac{1}{3} & \frac{1}{2} & -\frac{1}{2}\end{pmatrix},$$

$$\mathbf{C}^2=\begin{pmatrix}\frac{1}{9} & \frac{1}{6} & \frac{1}{4} & -\frac{1}{4}\\ \frac{16}{9} & \frac{2}{3} & -\frac{1}{2} & \frac{1}{2}\\ \frac{80}{81} & -\frac{5}{27} & \frac{13}{18} & \frac{5}{18}\\ \frac{16}{9} & -\frac{1}{3} & -\frac{1}{2} & -\frac{1}{2}\end{pmatrix}.$$

(3) Moreover, Eqs. (20a), (20b) need to have the signs in their last terms changed, as follows:

$$\delta_{\alpha\delta}\boldsymbol{\lambda}_{\gamma\rho}\cdot\boldsymbol{\lambda}_{\sigma\beta}+\delta_{\gamma\rho}\boldsymbol{\lambda}_{\alpha\delta}\cdot\boldsymbol{\lambda}_{\sigma\beta}+\delta_{\sigma\beta}\boldsymbol{\lambda}_{\gamma\rho}\cdot\boldsymbol{\lambda}_{\alpha\delta}$$
$$=\frac{2}{3}(\delta_{\alpha\beta}\boldsymbol{\lambda}_{\gamma\delta}\cdot\boldsymbol{\lambda}_{\sigma\rho}+\delta_{\gamma\delta}\boldsymbol{\lambda}_{\alpha\beta}\cdot\boldsymbol{\lambda}_{\sigma\rho}+\delta_{\sigma\rho}\boldsymbol{\lambda}_{\gamma\delta}\cdot\boldsymbol{\lambda}_{\alpha\beta})+\frac{16}{9}\delta_{\alpha\beta}\delta_{\gamma\delta}\delta_{\sigma\rho}$$
$$-\frac{1}{2}d^{abc}\boldsymbol{\lambda}^{a}_{\alpha\beta}\boldsymbol{\lambda}^{b}_{\gamma\delta}\boldsymbol{\lambda}^{c}_{\sigma\rho}-\frac{1}{2}if^{abc}\boldsymbol{\lambda}^{a}_{\alpha\beta}\boldsymbol{\lambda}^{b}_{\gamma\delta}\boldsymbol{\lambda}^{c}_{\sigma\rho},$$

$$\delta_{\alpha\rho}\boldsymbol{\lambda}_{\gamma\beta}\cdot\boldsymbol{\lambda}_{\sigma\delta}+\delta_{\gamma\beta}\boldsymbol{\lambda}_{\alpha\rho}\cdot\boldsymbol{\lambda}_{\sigma\delta}+\delta_{\sigma\beta}\boldsymbol{\lambda}_{\gamma\rho}\cdot\boldsymbol{\lambda}_{\alpha\delta}$$
$$=\frac{2}{3}(\delta_{\alpha\beta}\boldsymbol{\lambda}_{\gamma\delta}\cdot\boldsymbol{\lambda}_{\sigma\rho}+\delta_{\gamma\delta}\boldsymbol{\lambda}_{\alpha\beta}\cdot\boldsymbol{\lambda}_{\sigma\rho}+\delta_{\sigma\rho}\boldsymbol{\lambda}_{\gamma\delta}\cdot\boldsymbol{\lambda}_{\alpha\beta})+\frac{16}{9}\delta_{\alpha\beta}\delta_{\gamma\delta}\delta_{\sigma\rho}$$
$$-\frac{1}{2}d^{abc}\boldsymbol{\lambda}^{a}_{\alpha\beta}\boldsymbol{\lambda}^{b}_{\gamma\delta}\boldsymbol{\lambda}^{c}_{\sigma\rho}+\frac{1}{2}if^{abc}\boldsymbol{\lambda}^{a}_{\alpha\beta}\boldsymbol{\lambda}^{b}_{\gamma\delta}\boldsymbol{\lambda}^{c}_{\sigma\rho}.$$

All other results, as well as the conclusions of the paper remain unchanged.

[1] V. Dmitrašinović, J. Math. Phys. **42**, 991 (2001).