Erratum: Local analytic sector subtraction at NNLO

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1. In eq. (3.25) $\mathcal{N}_1$ should be replaced by $-\mathcal{N}_1^2$.

2. Eq. (3.55) should be replaced by

$$
\overline{\mathbf{S}}_{ij} \, RR = \frac{\mathcal{N}_1^2}{2} \sum_{\substack{c \neq i,j \\ d \neq i,j,c}} \left[\sum_{\substack{e \neq i,j,c,d \\ f \neq i,j,c,d}} \mathcal{I}_{cd}^{(i)} \mathcal{I}_{ef}^{(j)} B_{cdef}\left(\{\bar{k}\}^{(icd,jef)}\right) \right.
$$
$$
+ 4 \sum_{e \neq i,j,c,d} \mathcal{I}_{cd}^{(i)} \mathcal{I}_{ed}^{(j)} B_{cded}\left(\{\bar{k}\}^{(icd,jed)}\right) + 2 \mathcal{I}_{cd}^{(i)} \mathcal{I}_{cd}^{(j)} B_{cdcd}\left(\{\bar{k}\}^{(ijcd)}\right)
$$
$$
\left. + \left(\mathcal{I}_{cd}^{(ij)} - \frac{1}{2}\mathcal{I}_{cc}^{(ij)} - \frac{1}{2}\mathcal{I}_{dd}^{(ij)}\right) B_{cd}\left(\{\bar{k}\}^{(ijcd)}\right) \right]. \tag{3.55}
$$

3. Eq. (3.57) should be replaced by

$$
\overline{\mathbf{S}}_{ij} \, \overline{\mathbf{C}}_{ijk} \, RR = \frac{\mathcal{N}_1^2}{2} C_{f_k} \left[8 \mathcal{I}_{rk}^{(i)} \mathcal{I}_{rk}^{(j)} C_{f_k} + \mathcal{I}_{rr}^{(ij)} - 2 \mathcal{I}_{rk}^{(ij)} + \mathcal{I}_{kk}^{(ij)} \right] B\left(\{\bar{k}\}^{(ijkr)}\right), \tag{3.57}
$$

and the text below eq. (3.57) should be replaced by 'where the same $r \neq i,j,k$ should be chosen for all permutations of ijk'.

4. In eqs. (3.59), (3.60), (3.78), and (C.12) the index r should be replaced everywhere by l, and the index r' should be replaced everywhere by r. Accordingly, in the text below eqs. (3.60) and (C.12) the sentence 'where the same $r \neq i, j$ and $r' \neq i, k, l$' should be replaced by 'where the same $r \neq i, k, l$'.

5. In the last two lines of eq. (C.1) the terms proportional to $Q_{ij} C_A \delta_{f_k g}$ should change sign.

6. The second line of eq. (C.5) should include a multiplicative factor $(\delta_{f_i g}\delta_{f_j g} + \delta_{\{f_i f_j\}\{q\bar{q}\}})$.

7. Eq. (C.8) should be replaced by

$$
\overline{\mathbf{C}}_{ij}\, \overline{\mathbf{S}}_{ij} RR = \mathcal{N}_1 \frac{P_{ij}^{\mu\nu}\left(s_{ir}, s_{jr}\right)}{s_{ij}}\, \overline{\mathbf{S}}_j\, R_{\mu\nu}\Big(\{\bar{k}\}^{(ijr)}\Big)
$$
$$
= \frac{\mathcal{N}_1^2}{2} \sum_{\substack{c\neq i,j \\ d\neq i,j,c}} \mathcal{J}_{cd}^{(ij)} B_{cd}\Big(\{\bar{k}\}^{(ijr,jcd)}\Big). \tag{C.8}
$$

Accordingly, eq. (C.9) should be removed, together with the preceding comment '$c' \neq i, j, c$ must be the same that was used in the definition of $\overline{\mathbf{S}}_{ij} RR$, and we have defined the quantities'. Eq. (C.10) should be replaced by

$$
\mathcal{J}_{cd}^{(ij)} = -\left[\delta_{f_i g}\delta_{f_j g}\, 2\, C_A \left(\frac{x_i}{x_j} + \frac{x_j}{x_i}\right) + \delta_{\{f_i f_j\}\{q\bar{q}\}}\, T_R\right] \frac{2\, \bar{s}_{cd}^{(ijr)}}{s_{ij}\, \bar{s}_{jc}^{(ijr)}\, \bar{s}_{jd}^{(ijr)}}
$$
$$
- (d-2)\, \frac{Q_{ij}\left(s_{ir}, s_{jr}\right)}{2\, \tilde{k}^2\, s_{ij}} \left[\frac{2\tilde{k}\cdot\bar{k}_c^{(ijr)}}{\bar{s}_{jc}^{(ijr)}} - \frac{2\tilde{k}\cdot\bar{k}_d^{(ijr)}}{\bar{s}_{jd}^{(ijr)}}\right]^2. \tag{C.10}
$$

Below eq. (C.10) the text 'As in eq. (3.57) ... expressions in eqs. (C.9) and (C.10).' should also be removed.

8. Eq. (C.13) should be replaced by

$$
\overline{\mathbf{S}}_i\, \overline{\mathbf{S}}_{ik}\, \overline{\mathbf{C}}_{ijkl} RR
$$
$$
= 4\mathcal{N}_1^2\, \delta_{f_k g}\, C_{f_j}\, C_{f_l}\, \mathcal{I}_{jl}^{(i)}\, \frac{\bar{s}_{lr}^{(ijl)}}{\bar{s}_{kl}^{(ijl)}\, \bar{s}_{kr}^{(ijl)}}\, B\Big(\{\bar{k}\}^{(ijl,klr)}\Big)
$$
$$
+ 2\mathcal{N}_1^2\, \delta_{f_k g}\, C_{f_l}\, \mathcal{I}_{jl}^{(i)} \left[\frac{\bar{s}_{lr}^{(ijl)}}{\bar{s}_{kl}^{(ijl)}\, \bar{s}_{kr}^{(ijl)}}\, B_{jl}\Big(\{\bar{k}\}^{(ijl,klr)}\Big) - \frac{\bar{s}_{lr}^{(ilj)}}{\bar{s}_{kl}^{(ilj)}\, \bar{s}_{kr}^{(ilj)}}\, B_{lj}\Big(\{\bar{k}\}^{(ilj,klr)}\Big)\right], \tag{C.13}
$$

and the subsequent comment should be replaced by 'where the same $r \neq i, k, l$ should be chosen for all permutations in $\pi(\pi(ij)\,\pi(kl))$'.

9. Eqs. (C.14) should be replaced by

$$
\begin{aligned}
\overline{\mathbf{S}}_i\,\overline{\mathbf{S}}_{ij}RR = {}& -\,\mathcal{N}_1 \sum_{c\neq i\,d\neq i} \mathcal{I}^{(i)}_{cd}\,\overline{\mathbf{S}}_j\,R_{cd}\!\left(\{\bar{k}\}^{(icd)}\right)\\
= {}& \frac{\mathcal{N}_1^2}{2} \sum_{\substack{c\neq i,j\\ d\neq i,j,c}} \left[\sum_{\substack{e\neq i,j,c,d\\ f\neq i,j,c,d}} \mathcal{I}^{(i)}_{cd}\,\delta_{f_jg}\,\frac{\bar{s}^{(icd)}_{ef}}{\bar{s}^{(icd)}_{ej}\,\bar{s}^{(icd)}_{fj}} B_{cdef}\!\left(\{\bar{k}\}^{(icd,jef)}\right) \right.\\
& + 2 \sum_{e\neq i,j,c,d} \mathcal{I}^{(i)}_{cd}\,\delta_{f_jg}\,\frac{\bar{s}^{(icd)}_{ed}}{\bar{s}^{(icd)}_{ej}\,\bar{s}^{(icd)}_{dj}} B_{cded}\!\left(\{\bar{k}\}^{(icd,jed)}\right)\\
& + 2 \sum_{e\neq i,j,c,d} \mathcal{I}^{(i)}_{cd}\,\delta_{f_jg}\,\frac{\bar{s}^{(idc)}_{ed}}{\bar{s}^{(idc)}_{ej}\,\bar{s}^{(idc)}_{dj}} B_{cded}\!\left(\{\bar{k}\}^{(idc,jed)}\right)\\
& \left. + 2\,\mathcal{I}^{(i)}_{cd}\,\delta_{f_jg}\,\frac{\bar{s}^{(icd)}_{cd}}{\bar{s}^{(icd)}_{cj}\,\bar{s}^{(icd)}_{dj}} B_{cdcd}\!\left(\{\bar{k}\}^{(ijcd)}\right) + \overline{\mathcal{I}}^{(ij)\,\mathrm{s.o.}}_{cd}\,B_{cd}\!\left(\{\bar{k}\}^{(ijcd)}\right) \right].
\end{aligned}
\tag{C.14}
$$

and eq. (C.15) should be replaced by

$$
\overline{\mathcal{I}}^{(ij)\,\mathrm{s.o.}}_{cd} \equiv -2\,C_A\delta_{f_jg}\left[\mathcal{I}^{(i)}_{cj}\,\frac{\bar{s}^{(icj)}_{cd}}{\bar{s}^{(icj)}_{jc}\,\bar{s}^{(icj)}_{jd}} + \mathcal{I}^{(i)}_{jd}\,\frac{\bar{s}^{(ijd)}_{cd}}{\bar{s}^{(ijd)}_{jc}\,\bar{s}^{(ijd)}_{jd}} - \mathcal{I}^{(i)}_{cd}\,\frac{\bar{s}^{(icd)}_{cd}}{\bar{s}^{(icd)}_{jc}\,\bar{s}^{(icd)}_{jd}} \right].
\tag{C.15}
$$

10. Eq. (C.16) should be replaced by

$$
\overline{\mathbf{S}}_i\,\overline{\mathbf{C}}_{ijk}\,RR = \mathcal{N}_1^2 \sum_{a,b=j,k,r} C^r_{ab}\,\mathcal{I}^{(i)}_{ab}\,\frac{P^{\mu\nu}_{jk}\!\left(\bar{s}^{(iab)}_{jr},\bar{s}^{(iab)}_{kr}\right)}{\bar{s}^{(iab)}_{jk}}\,B_{\mu\nu}\!\left(\{\bar{k}\}^{(iab,jkr)}\right).
\tag{C.16}
$$

and eq. (C.17) should be replaced by

$$
\begin{aligned}
C^r_{ab} \equiv \frac{1}{2}\Big[& (C_{f_{[jk]}} + C_{f_j} - C_{f_k})(\delta_{aj}\delta_{br} + \delta_{ar}\delta_{bj})\\
& + (C_{f_{[jk]}} + C_{f_k} - C_{f_j})(\delta_{ak}\delta_{br} + \delta_{ar}\delta_{bk})\\
& - (C_{f_{[jk]}} - C_{f_j} - C_{f_k})(\delta_{aj}\delta_{bk} + \delta_{ak}\delta_{bj})\Big].
\end{aligned}
\tag{C.17}
$$

11. Eqs. (C.18) and (C.19) should be replaced by the single equation

$$
\overline{\mathbf{S}}_i\,\overline{\mathbf{S}}_{ij}\,\overline{\mathbf{C}}_{ijk}\,RR = \mathcal{N}_1^2 \sum_{a,b=j,k,r} C^r_{ab}\,\mathcal{I}^{(i)}_{ab}\,2\,C_{f_k}\,\delta_{f_jg}\,\frac{\bar{s}^{(iab)}_{kr}}{\bar{s}^{(iab)}_{jr}\,\bar{s}^{(iab)}_{jk}}\,B\!\left(\{\bar{k}\}^{(iab,jkr)}\right).
$$

12. We note that, in all equations where colour-connected Born amplitudes appear, the sums over parton indices are understood to run over the partons that are present at Born level.