

Appendix

Atomic Two-Electron Integrals

The atomic orbitals are considered in spherical harmonics complex basis labeled as l_m for each $|l, m\rangle \equiv Y_{l,m}$.

At the entry of each table, the conversion of primitive radial integrals (superscript k index) to parameters with k subscripts is given:

$$R^k(n_a l_a, n_b l_b, n_c l_c, n_d l_d) = R_k(n_a l_a, n_b l_b, n_c l_c, n_d l_d) D_k(l_a, l_b, l_c, l_d) \quad (\text{A.1})$$

with the particular situations:

$$F_k(n_a l_a, n_b l_b) = R_k(n_a l_a, n_b l_b, n_a l_a, n_b l_b), \quad (\text{A.2})$$

$$G_k(n_a l_a, n_b l_b) = R_k(n_a l_a, n_b l_b, n_b l_b, n_a l_a). \quad (\text{A.3})$$

The rescaling avoids the fractional coefficients in the given set of integrals (Tables A.1, A.2, A.3, A.4, A.5, A.6 and A.7)

The inter-shell d-d integrals are not tabulated. These can be obtained, similar to the previously given inter-shell p-p elements with the duplication algorithms suggested in sequel.

The integrals having patterns like $(d_i', d_j | d_k', d_l)$, $(d_i, d_j' | d_k, d_l')$ receive the same expansion in terms of $F_k^{\text{dd}'} = F_k(n, 2; n', 2)$ like the $(d_i, d_j | d_k, d_l)$ one-shell integrals in terms of $F_k^{\text{dd}} = F_k(n, 2; n, 2)$.

The integrals having patterns like $(d_i', d_j | d_k, d_l')$, $(d_i, d_j' | d_k', d_l)$, $(d_i', d_j' | d_k, d_l)$, $(d_i, d_j | d_k', d_l')$ receive the same expansion in terms of $G_k^{\text{dd}'} = G_k(n, 2; n', 2)$ like the $(d_i, d_j | d_k, d_l)$ one-shell integrals in terms of $F_k^{\text{dd}} = F_k(n, 2; n, 2)$.

The integrals having patterns like $(d_i', d_j | d_k, d_l)$, $(d_i, d_j' | d_k, d_l)$, $(d_i', d_j | d_k', d_l)$, $(d_i, d_j | d_k, d_l')$ receive the same expansion in terms of $R_k^{\text{dddd}'} = R_k(n, 2; n, 2; n, 2; n', 2)$ like the $(d_i, d_j | d_k, d_l)$ one-shell integrals in terms of $F_k^{\text{dd}} = F_k(n, 2; n, 2)$. (Tables A.8, A.9, A.10, A.11, A.12 and A.13)

Table A.1 Two-electron integrals made with s-type orbitals

Formulas	Integrals
F_0^{ss}	(ss ss)
$F_0^{ss'}$	(ss ss'), (s's s's)
$C_0^{ss'}$	(ss s's), (s's ss'), (s's' ss), (ss s's')
$R_0^{ssss'}$	(s's ss), (ss ss'), (ss s's), (ss ss')

Table A.2 Two-electron integrals made with p-type orbitals; here $F^0(pp) = F_0^{pp}$, $F^2(pp) = 25F_2^{pp}$

Formulas	Integrals
$F_0^{pp} + 4F_2^{pp}$	(p ₀ p ₀ p ₀ p ₀)
$F_0^{pp} + F_2^{pp}$	(p ₋₁ p ₋₁ p ₋₁ p ₋₁), (p ₊₁ p ₋₁ p ₊₁ p ₋₁), (p ₋₁ p ₊₁ p ₋₁ p ₊₁), (p ₊₁ p ₊₁ p ₊₁ p ₊₁)
$F_0^{pp} - 2F_2^{pp}$	(p ₀ p ₋₁ p ₀ p ₋₁), (p ₋₁ p ₀ p ₋₁ p ₀), (p ₊₁ p ₀ p ₊₁ p ₀), (p ₀ p ₊₁ p ₀ p ₊₁)
$6F_2^{pp}$	(p ₊₁ p ₋₁ p ₋₁ p ₊₁), (p ₋₁ p ₊₁ p ₊₁ p ₋₁)
$3F_2^{pp}$	(p ₀ p ₋₁ p ₋₁ p ₀), (p ₋₁ p ₀ p ₀ p ₋₁), (p ₊₁ p ₀ p ₀ p ₊₁), (p ₀ p ₊₁ p ₊₁ p ₀)
$-3F_2^{pp}$	(p ₊₁ p ₋₁ p ₀ p ₀), (p ₀ p ₀ p ₊₁ p ₋₁), (p ₀ p ₀ p ₋₁ p ₊₁), (p ₋₁ p ₊₁ p ₀ p ₀)

Table A.3 Table of Coulomb-type integrals made with p-type orbitals from different shells, p and p'; here $F^0(pp') = F_0^{pp'}$, $F^2(pp') = 25F_2^{pp'}$

Formulas	Integrals
$F_0^{pp'} + 4F_2^{pp'}$	(p ₀ p ₀ ' p ₀ p ₀ '), (p ₀ 'p ₀ p ₀ 'p ₀)
$F_0^{pp'} + F_2^{pp'}$	(p ₋₁ p ₋₁ ' p ₋₁ p ₋₁ '), (p ₊₁ p ₋₁ ' p ₊₁ p ₋₁ '), (p ₋₁ p ₊₁ ' p ₋₁ p ₊₁ '), (p ₊₁ p ₊₁ ' p ₊₁ p ₊₁ '), (p ₋₁ 'p ₋₁ p ₋₁ 'p ₋₁), (p ₊₁ 'p ₋₁ p ₊₁ 'p ₋₁), (p ₋₁ 'p ₊₁ p ₋₁ 'p ₊₁), (p ₊₁ 'p ₊₁ p ₊₁ 'p ₊₁)
$F_0^{pp'} - 2F_2^{pp'}$	(p ₀ p ₋₁ ' p ₀ p ₋₁ '), (p ₋₁ p ₀ ' p ₋₁ p ₀ '), (p ₊₁ p ₀ ' p ₊₁ p ₀ '), (p ₀ p ₊₁ ' p ₀ p ₊₁ '), (p ₀ 'p ₋₁ p ₀ 'p ₋₁), (p ₋₁ 'p ₀ p ₋₁ 'p ₀), (p ₊₁ 'p ₀ p ₊₁ 'p ₀), (p ₀ 'p ₊₁ p ₀ 'p ₊₁)
$6F_2^{pp'}$	(p ₊₁ p ₋₁ ' p ₋₁ p ₊₁ '), (p ₋₁ p ₊₁ ' p ₊₁ p ₋₁ '), (p ₊₁ 'p ₋₁ p ₋₁ 'p ₊₁), (p ₋₁ 'p ₊₁ p ₊₁ 'p ₋₁)
$3F_2^{pp'}$	(p ₀ p ₋₁ ' p ₋₁ p ₀ '), (p ₋₁ p ₀ ' p ₀ p ₋₁ '), (p ₊₁ p ₀ ' p ₀ p ₊₁ '), (p ₀ p ₊₁ ' p ₊₁ p ₀ '), (p ₀ 'p ₋₁ p ₋₁ 'p ₀), (p ₋₁ 'p ₀ p ₀ 'p ₋₁), (p ₊₁ 'p ₀ p ₀ 'p ₊₁), (p ₀ 'p ₊₁ p ₊₁ 'p ₀)
$-3F_2^{pp'}$	(p ₊₁ p ₋₁ ' p ₀ p ₀ '), (p ₀ p ₀ ' p ₊₁ p ₋₁ '), (p ₀ p ₀ ' p ₋₁ p ₊₁ '), (p ₋₁ p ₊₁ ' p ₀ p ₀ '), (p ₊₁ 'p ₋₁ p ₀ 'p ₀), (p ₀ 'p ₀ p ₊₁ 'p ₋₁), (p ₀ 'p ₀ p ₋₁ 'p ₊₁), (p ₋₁ 'p ₊₁ p ₀ 'p ₀)

Table A.4 Table of exchange-type integrals made with p-type orbitals from different shells, p and p'; here $G^0(pp') = G_0^{pp'}$, $G^2(pp') = 25G_2^{pp'}$

Formulas	Integrals
$G_0^{pp'} + 4G_2^{pp'}$	$(p_0p_0' p_0'p_0), (p_0'p_0 p_0p_0'), (p_0'p_0' p_0p_0), (p_0p_0 p_0'p_0')$
$G_0^{pp'} + G_2^{pp'}$	$(p_{-1}p_{-1}' p_{-1}'p_{-1}), (p_{+1}p_{+1}' p_{+1}'p_{+1}), (p_{-1}p_{+1}' p_{-1}'p_{+1}), (p_{+1}p_{-1}' p_{+1}'p_{-1})$ $(p_{-1}'p_{-1} p_{-1}p_{-1}'), (p_{+1}'p_{+1} p_{+1}p_{+1}'), (p_{-1}'p_{+1} p_{-1}p_{+1}'), (p_{+1}'p_{-1} p_{+1}p_{-1}')$ $(p_{-1}'p_{-1}' p_{-1}p_{-1}), (p_{+1}'p_{+1}' p_{+1}p_{+1}), (p_{-1}'p_{+1}' p_{-1}p_{+1}), (p_{+1}'p_{-1}' p_{+1}p_{-1})$ $(p_{-1}p_{-1} p_{-1}'p_{-1}'), (p_{+1}p_{+1} p_{+1}'p_{+1}'), (p_{-1}p_{+1} p_{-1}'p_{+1}'), (p_{+1}p_{-1} p_{+1}'p_{-1}')$
$G_0^{pp'} - 2G_2^{pp'}$	$(p_0p_{-1}' p_0'p_{-1}), (p_{-1}p_0' p_{-1}'p_0), (p_{+1}p_0' p_{+1}'p_0), (p_0p_{+1}' p_0'p_{+1})$ $(p_0'p_{-1} p_0p_{-1}'), (p_{-1}'p_0 p_{-1}p_0'), (p_{+1}'p_0 p_{+1}p_0'), (p_0'p_{+1} p_0p_{+1}')$ $(p_0'p_{-1}' p_0p_{-1}), (p_{-1}'p_0' p_{-1}p_0), (p_{+1}'p_0' p_{+1}p_0), (p_0'p_{+1}' p_0p_{+1})$ $(p_0p_{-1} p_0'p_{-1}'), (p_{-1}p_0 p_{-1}'p_0'), (p_{+1}p_0 p_{+1}'p_0'), (p_0p_{+1} p_0'p_{+1}')$
$6G_2^{pp'}$	$(p_{-1}p_{-1}' p_{-1}p_{+1}'), (p_{-1}p_{+1}' p_{+1}p_{-1}'), (p_{+1}p_{-1}' p_{-1}'p_{+1}), (p_{-1}p_{+1}' p_{+1}'p_{-1})$ $(p_{+1}'p_{-1}' p_{-1}p_{+1}), (p_{-1}'p_{+1}' p_{+1}p_{-1}), (p_{+1}p_{-1} p_{-1}'p_{+1}'), (p_{-1}p_{+1} p_{+1}'p_{-1}')$
$3G_2^{pp'}$	$(p_0p_{-1}' p_{-1}'p_0), (p_{-1}p_0' p_0'p_{-1}), (p_{+1}p_0' p_0'p_{+1}), (p_0p_{+1}' p_{+1}'p_0)$ $(p_0'p_{-1} p_{-1}p_0'), (p_{-1}'p_0 p_0p_{-1}'), (p_{+1}'p_0 p_0p_{+1}'), (p_0'p_{+1} p_{+1}p_0')$ $(p_0'p_{-1}' p_{-1}p_0), (p_{-1}'p_0' p_0p_{-1}), (p_{+1}'p_0' p_0p_{+1}), (p_0'p_{+1}' p_{+1}p_0)$ $(p_0p_{-1} p_{-1}'p_0'), (p_{-1}p_0 p_0'p_{-1}'), (p_{+1}p_0 p_0'p_{+1}'), (p_0p_{+1} p_{+1}'p_0')$
$-3G_2^{pp'}$	$(p_{+1}p_{-1}' p_0'p_0), (p_0p_0' p_{+1}'p_{-1}), (p_0p_0' p_{-1}'p_{+1}), (p_{-1}p_{+1}' p_0'p_0)$ $(p_{+1}'p_{-1} p_0p_0'), (p_0'p_0 p_{+1}p_{-1}'), (p_0'p_0 p_{-1}p_{+1}'), (p_{-1}'p_{+1} p_0p_0')$ $(p_{+1}'p_{-1}' p_0p_0), (p_0'p_0' p_{+1}p_{-1}), (p_0'p_0' p_{-1}p_{+1}), (p_{-1}'p_{+1}' p_0p_0)$ $(p_{+1}p_{-1} p_0'p_0'), (p_0p_0 p_{+1}'p_{-1}'), (p_0p_0 p_{-1}'p_{+1}'), (p_{-1}p_{+1} p_0'p_0')$

Table A.5 Table of asymmetric integrals made with p-type orbitals from different shells, p and p'; here $R^0(pppp') = R_0^{pppp'}$, $R^2(pppp') = 25R_2^{pppp'}$

Formulas	Integrals
$R_0^{pppp'} + 4R_2^{pppp'}$	$(p_0'p_0 p_0p_0), (p_0p_0' p_0p_0), (p_0p_0 p_0'p_0), (p_0p_0 p_0p_0')$
$R_0^{pppp'} + R_2^{pppp'}$	$(p_{-1}'p_{-1} p_{-1}p_{-1}), (p_{+1}'p_{+1} p_{+1}p_{+1}), (p_{-1}'p_{+1} p_{-1}p_{+1}), (p_{+1}'p_{-1} p_{+1}p_{-1})$ $(p_{-1}p_{-1}' p_{-1}p_{-1}'), (p_{+1}p_{+1}' p_{+1}p_{+1}'), (p_{-1}p_{+1}' p_{-1}p_{+1}'), (p_{+1}p_{-1}' p_{+1}p_{-1}')$ $(p_{-1}'p_{-1} p_{-1}'p_{-1}), (p_{+1}'p_{+1} p_{+1}'p_{+1}), (p_{-1}'p_{+1} p_{-1}'p_{+1}), (p_{+1}'p_{-1} p_{+1}'p_{-1})$ $(p_{-1}p_{-1} p_{-1}'p_{-1}'), (p_{+1}p_{+1} p_{+1}'p_{+1}'), (p_{-1}p_{+1} p_{-1}'p_{+1}'), (p_{+1}p_{-1} p_{+1}'p_{-1}')$
$R_0^{pppp'} - 2R_2^{pppp'}$	$(p_0'p_{-1} p_0p_{-1}), (p_{-1}'p_0 p_{-1}p_0), (p_{+1}'p_0 p_{+1}p_0), (p_0'p_{+1} p_0p_{+1})$ $(p_0p_{-1}' p_0p_{-1}), (p_{-1}p_0' p_{-1}p_0), (p_{+1}p_0' p_{+1}p_0), (p_0p_{+1}' p_0p_{+1})$ $(p_0p_{-1} p_0'p_{-1}), (p_{-1}p_0 p_{-1}'p_0), (p_{+1}p_0 p_{+1}'p_0), (p_0p_{+1} p_0'p_{+1})$ $(p_0p_{-1} p_0p_{-1}'), (p_{-1}p_0 p_{-1}p_0'), (p_{+1}p_0 p_{+1}p_0'), (p_0p_{+1} p_0p_{+1}')$
$6R_2^{pppp'}$	$(p_{+1}'p_{-1} p_{-1}p_{+1}), (p_{-1}'p_{+1} p_{+1}p_{-1}), (p_{+1}p_{-1}' p_{-1}'p_{+1}), (p_{-1}p_{+1}' p_{+1}'p_{-1})$ $(p_{+1}p_{-1} p_{-1}'p_{+1}'), (p_{-1}p_{+1} p_{+1}'p_{-1}'), (p_{+1}p_{-1} p_{-1}p_{+1}'), (p_{-1}p_{+1} p_{+1}p_{-1}')$
$3R_2^{pppp'}$	$(p_0'p_{-1} p_{-1}p_0), (p_{-1}'p_0 p_0p_{-1}), (p_{+1}'p_0 p_0p_{+1}), (p_0'p_{+1} p_{+1}p_0)$ $(p_0p_{-1}' p_{-1}p_0), (p_{-1}p_0' p_0p_{-1}), (p_{+1}p_0' p_0p_{+1}), (p_0p_{+1}' p_{+1}p_0)$ $(p_0p_{-1} p_{-1}'p_0), (p_{-1}p_0 p_0'p_{-1}), (p_{+1}p_0 p_0'p_{+1}), (p_0p_{+1} p_{+1}'p_0)$ $(p_0p_{-1} p_{-1}p_0'), (p_{-1}p_0 p_0'p_{-1}'), (p_{+1}p_0 p_0'p_{+1}'), (p_0p_{+1} p_{+1}'p_0')$
$-3R_2^{pppp'}$	$(p_{+1}'p_{-1} p_0p_0), (p_0'p_0 p_{+1}'p_{-1}), (p_0'p_0 p_{-1}'p_{+1}), (p_{-1}'p_{+1} p_0p_0)$ $(p_{+1}p_{-1}' p_0p_0'), (p_0p_0' p_{+1}p_{-1}), (p_0p_0' p_{-1}p_{+1}), (p_{-1}p_{+1}' p_0p_0)$ $(p_{+1}p_{-1} p_0'p_0), (p_0p_0 p_{+1}'p_{-1}), (p_0p_0 p_{-1}'p_{+1}), (p_{-1}p_{+1} p_0'p_0')$ $(p_{+1}p_{-1} p_0p_0'), (p_0p_0 p_{+1}p_{-1}'), (p_0p_0 p_{-1}p_{+1}'), (p_{-1}p_{+1} p_0p_0')$

Table A.6 Two-electron integrals made with s- and p-type orbitals; here $F^0(sp) = F_0^{sp}$, $G^1(sp) = 3G_1^{sp}$

Formulas	Integrals
sp	
F_0^{sp}	$(p_{-1}s p_{-1}s), (p_0s p_0s), (p_{+1}s p_{+1}s), (sp_{-1} sp_{-1}),$ $(sp_0 sp_0), (sp_{+1} sp_{+1})$
G_1^{sp}	$(p_{-1}s sp_{-1}), (ss p_0p_0), (p_0s sp_0), (p_{+1}s sp_{+1}),$ $(sp_{-1} p_{-1}s), (sp_0 p_0s), (p_0p_0 ss), (sp_{+1} p_{+1}s)$
$-G_1^{sp}$	$(ss p_{+1}p_{-1}), (ss p_{-1}p_{+1}), (p_{+1}p_{-1} ss), (p_{-1}p_{+1} ss)$

Table A.7 Two-electron integrals made with d-type orbitals; here $F^0(dd) = F_0^{dd}$, $F^2(dd) = 25F_2^{dd}$, $F^4(dd) = 441F_4^{dd}$

$F_0^{dd} + 4F_2^{dd} + 36F_4^{dd}$	$(d_0d_0 d_0d_0)$
$F_0^{dd} + 2F_2^{dd} - 24F_4^{dd}$	$(d_0d_{-1} d_0d_{-1}), (d_{-1}d_0 d_{-1}d_0), (d_{+1}d_0 d_{+1}d_0), (d_0d_{+1} d_0d_{+1})$
$F_2^{dd} + 30F_4^{dd}$	$(d_0d_{-1} d_{-1}d_0), (d_{-1}d_0 d_0d_{-1}), (d_{+1}d_0 d_0d_{+1}), (d_0d_{+1} d_{+1}d_0)$
$-F_2^{dd} - 30F_4^{dd}$	$(d_{+1}d_{-1} d_0d_0), (d_0d_0 d_{+1}d_{-1}), (d_0d_0 d_{-1}d_{+1}), (d_{-1}d_{+1} d_0d_0)$
$F_0^{dd} - 4F_2^{dd} + 6F_4^{dd}$	$(d_0d_{-2} d_0d_{-2}), (d_{-2}d_0 d_{-2}d_0), (d_{+2}d_0 d_{+2}d_0), (d_0d_{+2} d_0d_{+2})$
$4F_2^{dd} + 15F_4^{dd}$	$(d_0d_{-2} d_{-2}d_0), (d_{+2}d_{-2} d_0d_0), (d_{-2}d_0 d_0d_{-2}), (d_0d_0 d_{+2}d_{-2}),$ $(d_0d_0 d_{-2}d_{+2}), (d_{+2}d_0 d_0d_{+2}), (d_{-2}d_{+2} d_0d_0), (d_0d_{+2} d_{+2}d_0)$
$F_0^{dd} + F_2^{dd} + 16F_4^{dd}$	$(d_{-1}d_{-1} d_{-1}d_{-1}), (d_{+1}d_{-1} d_{+1}d_{-1}), (d_{-1}d_{+1} d_{-1}d_{+1}), (d_{+1}d_{+1} d_{+1}d_{+1})$
$F_0^{dd} + 4F_2^{dd} + F_4^{dd}$	$(d_{-2}d_{-2} d_{-2}d_{-2}), (d_{+2}d_{-2} d_{+2}d_{-2}), (d_{-2}d_{+2} d_{-2}d_{+2}), (d_{+2}d_{+2} d_{+2}d_{+2})$
$70F_4^{dd}$	$(d_{+2}d_{-2} d_{-2}d_{+2}), (d_{-2}d_{+2} d_{+2}d_{-2})$
$F_0^{dd} - 2F_2^{dd} - 4F_4^{dd}$	$(d_{-1}d_{-2} d_{-1}d_{-2}), (d_{+1}d_{-2} d_{+1}d_{-2}), (d_{-2}d_{-1} d_{-2}d_{-1}), (d_{+2}d_{-1} d_{+2}d_{-1}),$ $(d_{-2}d_{+1} d_{-2}d_{+1}), (d_{+2}d_{+1} d_{+2}d_{+1}), (d_{-1}d_{+2} d_{-1}d_{+2}), (d_{+1}d_{+2} d_{+1}d_{+2})$
$35F_4^{dd}$	$(d_{+1}d_{-2} d_{-2}d_{+1}), (d_{+2}d_{-1} d_{-1}d_{+2}), (d_{-2}d_{+1} d_{+1}d_{-2}), (d_{-1}d_{+2} d_{+2}d_{-1})$
$-35F_4^{dd}$	$(d_{+2}d_{-2} d_{-1}d_{+1}), (d_{+1}d_{-1} d_{-2}d_{+2}), (d_{-1}d_{+1} d_{+2}d_{-2}), (d_{-2}d_{+2} d_{+1}d_{-1})$
$6F_2^{dd} + 5F_4^{dd}$	$(d_{-1}d_{-2} d_{-2}d_{-1}), (d_{-2}d_{-1} d_{-1}d_{-2}), (d_{+2}d_{+1} d_{+1}d_{+2}), (d_{+1}d_{+2} d_{+2}d_{+1})$
$-6F_2^{dd} - 5F_4^{dd}$	$(d_{+2}d_{-2} d_{+1}d_{-1}), (d_{+1}d_{-1} d_{+2}d_{-2}), (d_{-1}d_{+1} d_{-2}d_{+2}), (d_{-2}d_{+2} d_{-1}d_{+1})$
$2\sqrt{6}F_2^{dd} - 10\sqrt{6}F_4^{dd}$	$(d_{+1}d_{-2} d_{-1}d_0), (d_0d_{-1} d_{-2}d_{+1}), (d_{+2}d_{-1} d_0d_{+1}), (d_{-1}d_0 d_{+1}d_{-2}),$ $(d_{+1}d_0 d_{-1}d_{+2}), (d_{-2}d_{+1} d_0d_{-1}), (d_0d_{+1} d_{+2}d_{-1}), (d_{-1}d_{+2} d_{+1}d_0)$
$\sqrt{6} - 5\sqrt{6}F_4^{dd}$	$(d_0d_{-2} d_{-1}d_{-1}), (d_{-1}d_{-1} d_0d_{-2}), (d_{-1}d_{-1} d_{-2}d_0), (d_{-2}d_0 d_{-1}d_{-1}),$ $(d_{+2}d_0 d_{+1}d_{+1}), (d_{+1}d_{+1} d_{+2}d_0), (d_{+1}d_{+1} d_0d_{+2}), (d_0d_{+2} d_{+1}d_{+1})$
$-\sqrt{6}F_2^{dd} + 5\sqrt{6}F_4^{dd}$	$(d_{+1}d_{-2} d_0d_{-1}), (d_0d_{-1} d_{+1}d_{-2}), (d_{+2}d_{-1} d_{+1}d_0), (d_{+1}d_0 d_{+2}d_{-1}),$ $(d_{-1}d_0 d_{-2}d_{+1}), (d_{-2}d_{+1} d_{-1}d_0), (d_0d_{+1} d_{-1}d_{+2}), (d_{-1}d_{+2} d_0d_{+1})$

Table A.8 Two-electron integrals made with s- and d-type orbitals; here $F^0(sd) = F_0^{sd}$, $G^2(sd) = 5G_2^{sd}$, $R^2(ddds) = 7\sqrt{5}R_2^{ddds}$

Formulas	Integrals
F_0^{sd}	$(d_{-2}s d_{-2}s), (d_{-1}s d_{-1}s), (d_0s d_0s), (d_{+1}s d_{+1}s), (d_{+2}s d_{+2}s),$ $(sd_{-2} sd_{-2}), (sd_{-1} sd_{-1}), (sd_0 sd_0), (sd_{+1} sd_{+1}), (sd_{+2} sd_{+2})$
G_2^{sd}	$(ss d_{+2}d_{-2}), (d_{-2}s sd_{-2}), (d_{-1}s sd_{-1}), (ss d_0d_0), (d_0s sd_0),$ $(d_{+1}s sd_{+1}), (ss d_{-2}d_{+2}), (d_{+2}s sd_{+2}), (sd_{-2} d_{-2}s), (d_{+2}d_{-2} ss),$ $(sd_{-1} d_{-1}s), (sd_0 d_0s), (d_0d_0 ss), (sd_{+1} d_{+1}s), (sd_{+2} d_{+2}s), (d_{-2}d_{+2} ss)$
$-G_2^{sd}$	$(ss d_{+1}d_{-1}), (ss d_{-1}d_{+1}), (d_{+1}d_{-1} ss), (d_{-1}d_{+1} ss)$
R_2^{ddds}	$(d_{-1}s d_0d_{-1}), (d_{-1}s d_{-1}d_0), (d_{+1}s d_{+1}d_0), (d_{+1}s d_0d_{+1}),$ $(d_0d_{-1} d_{-1}s), (sd_{-1} d_0d_{-1}), (d_0d_{-1} sd_{-1}), (sd_{-1} d_{-1}d_0),$ $(d_{-1}d_0 d_{-1}s), (d_{+1}d_0 d_{+1}s), (d_{-1}d_0 sd_{-1}), (d_{+1}d_0 sd_{+1}),$ $(d_0d_{+1} d_{+1}s), (sd_{+1} d_{+1}d_0), (sd_{+1} d_0d_{+1}), (d_0d_{+1} sd_{+1})$
$-R_2^{ddds}$	$(d_0s d_{+1}d_{-1}), (d_0s d_{-1}d_{+1}), (d_{+1}d_{-1} d_0s), (d_{+1}d_{-1} sd_0),$ $(sd_0 d_{+1}d_{-1}), (sd_0 d_{-1}d_{+1}), (d_{-1}d_{+1} d_0s), (d_{-1}d_{+1} sd_0)$
$-R_2^{spds}$	$(p_{-1}s p_{-1}d_0), (p_{+1}s p_{+1}d_0), (sp_{-1} d_0p_{-1}), (d_0p_{-1} sp_{-1}),$ $(sp_{+1} d_0p_{+1}), (d_0p_{+1} sp_{+1}), (p_{-1}d_0 p_{-1}s), (p_{+1}d_0 p_{+1}s)$
$2R_2^{ddds}$	$(d_0s d_0d_0), (d_0d_0 d_0s), (sd_0 d_0d_0), (d_0d_0 sd_0)$
$-2R_2^{ddds}$	$(d_{-2}s d_0d_{-2}), (d_0s d_{+2}d_{-2}), (d_{-2}s d_{-2}d_0), (d_{+2}s d_{+2}d_0),$ $(d_0s d_{-2}d_{+2}), (d_{+2}s d_0d_{+2}), (d_0d_{-2} d_{-2}s), (d_{+2}d_{-2} d_0s),$ $(sd_{-2} d_0d_{-2}), (d_0d_{-2} sd_{-2}), (sd_{-2} d_{-2}d_0), (d_{+2}d_{-2} sd_0),$ $(d_{-2}d_0 d_{-2}s), (d_{+2}d_0 d_{+2}s), (sd_0 d_{+2}d_{-2}), (d_{-2}d_0 sd_{-2}),$ $(sd_0 d_{-2}d_{+2}), (d_{+2}d_0 sd_{+2}), (d_{-2}d_{+2} d_0s), (d_0d_{+2} d_{+2}s),$ $(sd_{+2} d_{+2}d_0), (d_{-2}d_{+2} sd_0), (sd_{+2} d_0d_{+2}), (d_0d_{+2} sd_{+2})$
$\sqrt{6}R_2^{ddds}$	$(d_{-2}s d_{-1}d_{-1}), (d_{+2}s d_{+1}d_{+1}), (sd_{-2} d_{-1}d_{-1}), (d_{-1}d_{-1} d_{-2}s),$ $(d_{-1}d_{-1} sd_{-2}), (d_{+1}d_{+1} d_{+2}s), (d_{+1}d_{+1} sd_{+2}), (sd_{+2} d_{+1}d_{+1})$
$-\sqrt{6}R_2^{ddds}$	$(d_{-1}s d_{+1}d_{-2}), (d_{+1}s d_{+2}d_{-1}), (d_{-1}s d_{-2}d_{+1}), (d_{+1}s d_{-1}d_{+2}),$ $(d_{+1}d_{-2} d_{-1}s), (d_{+1}d_{-2} sd_{-1}), (d_{+2}d_{-1} d_{+1}s), (sd_{-1} d_{+1}d_{-2}),$ $(sd_{-1} d_{-2}d_{+1}), (d_{+2}d_{-1} sd_{+1}), (d_{-2}d_{+1} d_{-1}s), (sd_{+1} d_{+2}d_{-1}),$ $(d_{-2}d_{+1} sd_{-1}), (sd_{+1} d_{-1}d_{+2}), (d_{-1}d_{+2} d_{+1}s), (d_{-1}d_{+2} sd_{+1})$

Table A.9 Two-electron integrals made with p- and d-type orbitals; here $F^0(\text{pd}) = F_0^{\text{pd}}$, $F^2(\text{pd}) = 35F_2^{\text{pd}}$, $G^1(\text{pd}) = 15G_1^{\text{pd}}$, $G^3(\text{pd}) = 245G_3^{\text{pd}}$

Formulas	Integrals
$F_0^{\text{pd}} + 4F_2^{\text{pd}}$	$(d_0p_0 d_0p_0), (p_0d_0 p_0d_0)$
$F_0^{\text{pd}} - 2F_2^{\text{pd}}$	$(d_0p_{-1} d_0p_{-1}), (d_0p_{+1} d_0p_{+1}), (p_{-1}d_0 p_{-1}d_0), (p_{+1}d_0 p_{+1}d_0)$
$F_0^{\text{pd}} - 4F_2^{\text{pd}}$	$(d_{-2}p_0 d_{-2}p_0), (d_{+2}p_0 d_{+2}p_0), (p_0d_{-2} p_0d_{-2}), (p_0d_{+2} p_0d_{+2})$
$F_0^{\text{pd}} - F_2^{\text{pd}}$	$(d_{-1}p_{-1} d_{-1}p_{-1}), (d_{+1}p_{-1} d_{+1}p_{-1}), (d_{-1}p_{+1} d_{-1}p_{+1}), (d_{+1}p_{+1} d_{+1}p_{+1}),$ $(p_{-1}d_{-1} p_{-1}d_{-1}), (p_{+1}d_{-1} p_{+1}d_{-1}), (p_{-1}d_{+1} p_{-1}d_{+1}), (p_{+1}d_{+1} p_{+1}d_{+1})$
$6F_2^{\text{pd}}$	$(d_{+1}p_{-1} d_{-1}p_{+1}), (d_{-1}p_{+1} d_{+1}p_{-1}), (p_{+1}d_{-1} p_{-1}d_{+1}), (p_{-1}d_{+1} p_{+1}d_{-1})$
$F_0^{\text{pd}} + 2F_2^{\text{pd}}$	$(d_{-2}p_{-1} d_{-2}p_{-1}), (d_{+2}p_{-1} d_{+2}p_{-1}), (d_{-1}p_0 d_{-1}p_0), (d_{+1}p_0 d_{+1}p_0),$ $(d_{-2}p_{+1} d_{-2}p_{+1}), (d_{+2}p_{+1} d_{+2}p_{+1}), (p_{-1}d_{-2} p_{-1}d_{-2}), (p_{+1}d_{-2} p_{+1}d_{-2}),$ $(p_0d_{-1} p_0d_{-1}), (p_0d_{+1} p_0d_{+1}), (p_{-1}d_{+2} p_{-1}d_{+2}), (p_{+1}d_{+2} p_{+1}d_{+2})$
$\sqrt{3}F_2^{\text{pd}}$	$(d_0p_{-1} d_{-1}p_0), (d_{-1}p_0 d_0p_{-1}), (d_{+1}p_0 d_0p_{+1}), (d_0p_{+1} d_{+1}p_0),$ $(p_0d_{-1} p_{-1}d_0), (p_{-1}d_0 p_0d_{-1}), (p_{+1}d_0 p_0d_{+1}), (p_0d_{+1} p_{+1}d_0)$
$-\sqrt{3}F_2^{\text{pd}}$	$(d_{+1}p_{-1} d_0p_0), (d_0p_0 d_{+1}p_{-1}), (d_0p_0 d_{-1}p_{+1}), (d_{-1}p_{+1} d_0p_0),$ $(p_{+1}d_{-1} p_0d_0), (p_0d_0 p_{+1}d_{-1}), (p_0d_0 p_{-1}d_{+1}), (p_{-1}d_{+1} p_0d_0)$
$3\sqrt{2}F_2^{\text{pd}}$	$(d_{-1}p_{-1} d_{-2}p_0), (d_{-2}p_0 d_{-1}p_{-1}), (d_{+2}p_0 d_{+1}p_{+1}), (d_{+1}p_{+1} d_{+2}p_0),$ $(p_0d_{-2} p_{-1}d_{-1}), (p_{-1}d_{-1} p_0d_{-2}), (p_{+1}d_{+1} p_0d_{+2}), (p_0d_{+2} p_{+1}d_{+1})$
$-3\sqrt{2}F_2^{\text{pd}}$	$(d_{+2}p_{-1} d_{+1}p_0), (d_{+1}p_0 d_{+2}p_{-1}), (d_{-1}p_0 d_{-2}p_{+1}), (d_{-2}p_{+1} d_{-1}p_0),$ $(p_{+1}d_{-2} p_0d_{-1}), (p_0d_{-1} p_{+1}d_{-2}), (p_0d_{+1} p_{-1}d_{+2}), (p_{-1}d_{+2} p_0d_{+1})$
$2\sqrt{6}F_2^{\text{pd}}$	$(d_0p_{-1} d_{-2}p_{+1}), (d_{+2}p_{-1} d_0p_{+1}), (d_{-2}p_{+1} d_0p_{-1}), (d_0p_{+1} d_{+2}p_{-1}),$ $(p_{+1}d_{-2} p_{-1}d_0), (p_{-1}d_0 p_{+1}d_{-2}), (p_{+1}d_0 p_{-1}d_{+2}), (p_{-1}d_{+2} p_{+1}d_0)$
$4G_1^{\text{pd}} + 27G_3^{\text{pd}}$	$(p_0p_0 d_0d_0), (d_0p_0 p_0d_0), (p_0d_0 d_0p_0), (d_0d_0 p_0p_0)$
$-G_1^{\text{pd}} - 18G_3^{\text{pd}}$	$(p_{+1}p_{-1} d_0d_0), (p_{-1}p_{+1} d_0d_0), (d_0d_0 p_{+1}p_{-1}), (d_0d_0 p_{-1}p_{+1}),$ $(d_0p_{-1} p_{-1}d_0), (d_0p_{+1} p_{+1}d_0), (p_{-1}d_0 d_0p_{-1}), (p_{+1}d_0 d_0p_{+1})$
$3G_1^{\text{pd}} + 24G_3^{\text{pd}}$	$(d_{-1}p_0 p_0d_{-1}), (d_{+1}p_0 p_0d_{+1}), (p_0d_{-1} d_{-1}p_0), (p_0d_{+1} d_{+1}p_0)$
$-3G_1^{\text{pd}} - 24G_3^{\text{pd}}$	$(p_0p_0 d_{+1}d_{-1}), (p_0p_0 d_{-1}d_{+1}), (d_{+1}d_{-1} p_0p_0), (d_{-1}d_{+1} p_0p_0)$
$30G_3^{\text{pd}}$	$(p_{+1}p_{-1} d_{-1}d_{+1}), (d_{+1}p_{-1} p_{-1}d_{+1}), (p_{-1}p_{+1} d_{+1}d_{-1}), (d_{-1}p_{+1} p_{+1}d_{-1}), (p_{+1}d_{-1} $ $d_{-1}p_{+1}), (d_{+1}d_{-1} p_{-1}p_{+1}), (p_{-1}d_{+1} d_{+1}p_{-1}), (d_{-1}d_{+1} p_{+1}p_{-1})$
$3G_1^{\text{pd}} + 9G_3^{\text{pd}}$	$(p_{-1}p_{-1} d_{-1}d_{-1}), (p_{+1}p_{-1} d_{+1}d_{-1}), (d_{-1}p_{-1} p_{-1}d_{-1}), (d_{+1}p_{-1} p_{+1}d_{-1}),$ $(p_{-1}p_{+1} d_{-1}d_{+1}), (p_{+1}p_{+1} d_{+1}d_{+1}), (d_{-1}p_{+1} p_{-1}d_{+1}), (d_{+1}p_{+1} p_{+1}d_{+1}),$ $(p_{-1}d_{-1} d_{-1}p_{-1}), (p_{+1}d_{-1} d_{+1}p_{-1}), (d_{-1}d_{-1} p_{-1}p_{-1}), (d_{+1}d_{-1} p_{+1}p_{-1}),$ $(p_{-1}d_{+1} d_{-1}p_{+1}), (p_{+1}d_{+1} d_{+1}p_{+1}), (d_{-1}d_{+1} p_{-1}p_{+1}), (d_{+1}d_{+1} p_{+1}p_{+1})$
$15G_3^{\text{pd}}$	$(p_0p_0 d_{+2}d_{-2}), (d_{-2}p_0 p_0d_{-2}), (p_0p_0 d_{-2}d_{+2}), (d_{+2}p_0 p_0d_{+2}),$ $(p_0d_{-2} d_{-2}p_0), (d_{+2}d_{-2} p_0p_0), (p_0d_{+2} d_{+2}p_0), (d_{-2}d_{+2} p_0p_0)$
$45G_3^{\text{pd}}$	$(d_{+2}p_{-1} p_{-1}d_{+2}), (d_{-2}p_{+1} p_{+1}d_{-2}), (p_{+1}d_{-2} d_{-2}p_{+1}), (p_{-1}d_{+2} d_{+2}p_{-1})$
$-45G_3^{\text{pd}}$	$(p_{+1}p_{-1} d_{-2}d_{+2}), (p_{-1}p_{+1} d_{+2}d_{-2}), (d_{+2}d_{-2} p_{-1}p_{+1}), (d_{-2}d_{+2} p_{+1}p_{-1})$
$6G_1^{\text{pd}} + 3G_3^{\text{pd}}$	$(d_{-2}p_{-1} p_{-1}d_{-2}), (d_{+2}p_{+1} p_{+1}d_{+2}), (p_{-1}d_{-2} d_{-2}p_{-1}), (p_{+1}d_{+2} d_{+2}p_{+1})$
$-6G_1^{\text{pd}} - 3G_3^{\text{pd}}$	$(p_{+1}p_{-1} d_{+2}d_{-2}), (p_{-1}p_{+1} d_{-2}d_{+2}), (d_{+2}d_{-2} p_{+1}p_{-1}), (d_{-2}d_{+2} p_{-1}p_{+1})$
$-15\sqrt{2}G_3^{\text{pd}}$	$(p_0p_{-1} d_{-2}d_{+1}), (d_{+2}p_{-1} p_0d_{+1}), (p_{-1}p_0 d_{+1}d_{-2}), (d_{-1}p_0 p_{+1}d_{-2}),$ $(p_{+1}p_0 d_{-1}d_{+2}), (d_{+1}p_0 p_{-1}d_{+2}), (p_0p_{+1} d_{+2}d_{-1}), (d_{-2}p_{+1} p_0d_{-1}),$ $(p_{+1}d_{-2} d_{-1}p_0), (d_{+1}d_{-2} p_{-1}p_0), (p_0d_{-1} d_{-2}p_{+1}), (d_{+2}d_{-1} p_0p_{+1}), (p_0d_{+1} d_{+2}p_{-1}),$ $(d_{-2}d_{+1} p_0p_{-1}), (p_{-1}d_{+2} d_{+1}p_0), (d_{-1}d_{+2} p_{+1}p_0)$

(continued)

Table A.9 (continued)

Formulas	Integrals
$2\sqrt{3}G_1^{pd} - 9\sqrt{3}G_3^{pd}$	$(p_0p_{-1} d_0d_{-1}), (d_0p_{-1} p_0d_{-1}), (p_{-1}p_0 d_{-1}d_0), (p_{+1}p_0 d_{+1}d_0),$ $(d_{-1}p_0 p_{-1}d_0), (d_{+1}p_0 p_{+1}d_0), (p_0p_{+1} d_0d_{+1}), (d_0p_{+1} p_0d_{+1}),$ $(p_0d_{-1} d_0p_{-1}), (d_0d_{-1} p_0p_{-1}), (p_{-1}d_0 d_{-1}p_0), (p_{+1}d_0 d_{+1}p_0),$ $(d_{-1}d_0 p_{-1}p_0), (d_{+1}d_0 p_{+1}p_0), (p_0d_{+1} d_0p_{+1}), (d_0d_{+1} p_0p_{+1})$
$-3\sqrt{2}G_1^{pd} + 6\sqrt{2}G_3^{pd}$	$(p_0p_{-1} d_{+1}d_{-2}), (p_{+1}p_0 d_{+2}d_{-1}), (p_{-1}p_0 d_{-2}d_{+1}), (p_0p_{+1} d_{-1}d_{+2}),$ $(d_{+1}d_{-2} p_0p_{-1}), (d_{+2}d_{-1} p_{+1}p_0), (d_{-2}d_{+1} p_{-1}p_0), (d_{-1}d_{+2} p_0p_{+1})$
$3\sqrt{2}G_1^{pd} - 6\sqrt{2}G_3^{pd}$	$(d_{-1}p_{-1} p_0d_{-2}), (d_{-2}p_0 p_{-1}d_{-1}), (d_{+2}p_0 p_{+1}d_{+1}), (d_{+1}p_{+1} p_0d_{+2}),$ $(p_0d_{-2} d_{-1}p_{-1}), (p_{-1}d_{-1} d_{-2}p_0), (p_{+1}d_{+1} d_{+2}p_0), (d_0d_{+2} d_{+1}p_{+1})$
$-\sqrt{3}G_1^{pd} + 12\sqrt{3}G_3^{pd}$	$(p_0p_{-1} d_{-1}d_0), (p_{-1}p_0 d_0d_{-1}), (p_{+1}p_0 d_0d_{+1}), (p_0p_{+1} d_{+1}d_0),$ $(d_0d_{-1} p_{-1}p_0), (d_{-1}d_0 p_0p_{-1}), (d_{+1}d_0 p_0p_{+1}), (d_0d_{+1} p_{+1}p_0)$
$\sqrt{3}G_1^{pd} - 12\sqrt{3}G_3^{pd}$	$(d_{+1}p_{-1} p_0d_0), (d_0p_0 p_{+1}d_{-1}), (d_0p_0 p_{-1}d_{+1}), (d_{-1}p_{+1} p_0d_0),$ $(p_{+1}d_{-1} d_0p_0), (p_0d_0 d_{+1}p_{-1}), (p_0d_0 d_{-1}p_{+1}), (p_{-1}d_{+1} d_0p_0)$
$\sqrt{6}G_1^{pd} + 3\sqrt{6}G_3^{pd}$	$(d_0p_{-1} p_{+1}d_{-2}), (d_{+2}p_{-1} p_{+1}d_0), (d_{-2}p_{+1} p_{-1}d_0), (d_0p_{+1} p_{-1}d_{+2}),$ $(p_{+1}d_{-2} d_0p_{-1}), (p_{+1}d_0 d_{+2}p_{-1}), (p_{-1}d_0 d_{-2}p_{+1}), (p_{-1}d_{+2} d_0p_{+1})$
$-\sqrt{6}G_1^{pd} - 3\sqrt{6}G_3^{pd}$	$(p_{-1}p_{-1} d_0d_{-2}), (p_{-1}p_{-1} d_{-2}d_0), (p_{+1}p_{+1} d_{+2}d_0), (p_{+1}p_{+1} d_0d_{+2}),$ $(d_0d_{-2} p_{-1}p_{-1}), (d_{-2}d_0 p_{-1}p_{-1}), (d_{+2}d_0 p_{+1}p_{+1}), (d_0d_{+2} p_{+1}p_{+1})$

Table A.10 Two-electron integrals made with s-, p- and d-type orbitals; here $R^1(\text{sppd}) = 3\sqrt{15}R_1^{\text{sppd}}$, $R^2(\text{sppd}) = 5\sqrt{5}R_2^{\text{sppd}}$

Formulas	Integrals
$2R_2^{\text{ppsd}}$	$(p_0s p_0d_0), (sp_0 d_0p_0), (d_0p_0 sp_0), (p_0d_0 p_0s)$
$2\sqrt{3}R_1^{\text{sppd}}$	$(p_0s d_0p_0), (d_0s p_0p_0), (p_0p_0 d_0s), (d_0p_0 p_0s),$ $(sp_0 p_0d_0), (p_0p_0 sd_0), (sd_0 p_0p_0), (p_0d_0 sp_0)$
$\sqrt{3}R_2^{\text{ppsd}}$	$(p_{-1}s p_0d_{-1}), (p_{+1}s p_0d_{+1}), (sp_{-1} d_{-1}p_0), (d_{-1}p_0 sp_{-1}),$ $(d_{+1}p_0 sp_{+1}), (sp_{+1} d_{+1}p_0), (p_0d_{-1} p_{-1}s), (p_0d_{+1} p_{+1}s)$
$-\sqrt{3}R_2^{\text{ppsd}}$	$(p_0s p_{+1}d_{-1}), (p_0s p_{-1}d_{+1}), (d_{+1}p_{-1} sp_0), (sp_0 d_{+1}p_{-1}),$ $(sp_0 d_{-1}p_{+1}), (d_{-1}p_{+1} sp_0), (p_{+1}d_{-1} p_0s), (p_{-1}d_{+1} p_0s)$
$-\sqrt{6}R_2^{\text{ppsd}}$	$(p_{-1}s p_{+1}d_{-2}), (p_{+1}s p_{-1}d_{+2}), (sp_{-1} d_{-2}p_{+1}), (d_{+2}p_{-1} sp_{+1}),$ $(sp_{+1} d_{+2}p_{-1}), (d_{-2}p_{+1} sp_{-1}), (p_{+1}d_{-2} p_{-1}s), (p_{-1}d_{+2} p_{+1}s)$
$3R_1^{\text{sppd}}$	$(d_{-1}s p_0p_{-1}), (p_{-1}s d_{-1}p_0), (p_{+1}s d_{+1}p_0), (d_{-1}s p_{-1}p_0),$ $(d_{+1}s p_{+1}p_0), (d_{+1}s p_0p_{+1}), (p_0p_{-1} d_{-1}s), (sp_{-1} p_0d_{-1}),$ $(p_0p_{-1} sd_{-1}), (p_{-1}p_0 d_{-1}s), (p_{+1}p_0 d_{+1}s), (d_{-1}p_0 p_{-1}s),$ $(d_{+1}p_0 p_{+1}s), (p_{-1}p_0 sd_{-1}), (p_{+1}p_0 sd_{+1}), (p_0p_{+1} d_{+1}s),$ $(sp_{+1} p_0d_{+1}), (p_0p_{+1} sd_{+1}), (sd_{-1} p_0p_{-1}), (p_0d_{-1} sp_{-1}),$ $(sd_{-1} p_{-1}p_0), (sd_{+1} p_{+1}p_0), (sd_{+1} p_0p_{+1}), (p_0d_{+1} sp_{+1})$
$-3R_1^{\text{sppd}}$	$(p_0s d_{+1}p_{-1}), (p_0s d_{-1}p_{+1}), (d_{+1}p_{-1} p_0s), (sp_0 p_{+1}d_{-1}),$ $(sp_0 p_{-1}d_{+1}), (d_{-1}p_{+1} p_0s), (p_{+1}d_{-1} sp_0), (p_{-1}d_{+1} sp_0)$
$\sqrt{3}R_1^{\text{sppd}}$	$(d_0s p_{+1}p_{-1}), (d_0s p_{-1}p_{+1}), (p_{+1}p_{-1} d_0s), (p_{+1}p_{-1} sd_0),$ $(p_{-1}p_{+1} d_0s), (p_{-1}p_{+1} sd_0), (sd_0 p_{+1}p_{-1}), (sd_0 p_{-1}p_{+1})$
$-\sqrt{3}R_1^{\text{sppd}}$	$(p_{-1}s d_0p_{-1}), (p_{+1}s d_0p_{+1}), (d_0p_{-1} p_{-1}s), (sp_{-1} p_{-1}d_0),$ $(d_0p_{+1} p_{+1}s), (sp_{+1} p_{+1}d_0), (p_{-1}d_0 sp_{-1}), (p_{+1}d_0 sp_{+1})$

(continued)

Table A.10 (continued)

Formulas	Integrals
$3\sqrt{2}R_1^{\text{sppd}}$	$(d_{-2}s p_{-1}p_{-1}), (d_{+2}s p_{+1}p_{+1}), (p_{-1}p_{-1} d_{-2}s), (p_{-1}p_{-1} sd_{-2}),$ $(p_{+1}p_{+1} d_{+2}s), (p_{+1}p_{+1} sd_{+2}), (sd_{-2} p_{-1}p_{-1}), (sd_{+2} p_{+1}p_{+1})$
$-3\sqrt{2}R_1^{\text{sppd}}$	$(p_{+1}s d_{+2}p_{-1}), (p_{-1}s d_{-2}p_{+1}), (d_{+2}p_{-1} p_{+1}s), (sp_{-1} p_{+1}d_{-2}),$ $(d_{-2}p_{+1} p_{-1}s), (sp_{+1} p_{-1}d_{+2}), (p_{+1}d_{-2} sp_{-1}), (p_{-1}d_{+2} sp_{+1})$

Table A.11 Two-electron integrals made with f-type orbitals; here $F^0(\text{ff}) = F_0^{\text{ff}}$, $F^2(\text{ff}) = 225F_2^{\text{ff}}$, $F^4(\text{ff}) = 1089F_4^{\text{ff}}$, $F^6(\text{ff}) = \left(\frac{184041}{25}\right)F_6^{\text{ff}}$

Formulas	Integrals
$F_0^{\text{ff}} + 16F_2^{\text{ff}} + 36F_4^{\text{ff}} + 400F_6^{\text{ff}}$	$(f_0f_0 f_0f_0)$
$F_0^{\text{ff}} + 9F_2^{\text{ff}} + F_4^{\text{ff}} + 225F_6^{\text{ff}}$	$(f_1f_1 f_1f_1), (f_1f_{-1} f_1f_{-1}), (f_{-1}f_1 f_{-1}f_1), (f_{-1}f_{-1} f_{-1}f_{-1})$
$F_0^{\text{ff}} + 49F_2^{\text{ff}} + 36F_4^{\text{ff}}$	$(f_2f_2 f_2f_2), (f_2f_{-2} f_2f_{-2}), (f_{-2}f_2 f_{-2}f_2), (f_{-2}f_{-2} f_{-2}f_{-2})$
$F_0^{\text{ff}} + 25F_2^{\text{ff}} + 9F_4^{\text{ff}} + F_6^{\text{ff}}$	$(f_3f_{-3} f_3f_{-3}), (f_{-3}f_3 f_{-3}f_3), (f_{-3}f_{-3} f_{-3}f_{-3}), (f_3f_3 f_3f_3)$
$F_0^{\text{ff}} + 12F_2^{\text{ff}} + 6F_4^{\text{ff}} - 300F_6^{\text{ff}}$	$(f_0f_1 f_0f_1), (f_0f_{-1} f_0f_{-1}), (f_1f_0 f_1f_0), (f_{-1}f_0 f_{-1}f_0)$
$F_0^{\text{ff}} - 42F_2^{\text{ff}} + 120F_4^{\text{ff}}$	$(f_0f_2 f_0f_2), (f_0f_{-2} f_0f_{-2}), (f_2f_0 f_2f_0), (f_{-2}f_0 f_{-2}f_0)$
$F_0^{\text{ff}} - 7F_2^{\text{ff}} - 90F_4^{\text{ff}}$	$(f_1f_2 f_1f_2), (f_1f_{-2} f_1f_{-2}), (f_{-1}f_2 f_{-1}f_2), (f_{-1}f_{-2} f_{-1}f_{-2}),$ $(f_2f_1 f_2f_1), (f_2f_{-1} f_2f_{-1}), (f_{-2}f_1 f_{-2}f_1), (f_{-2}f_{-1} f_{-2}f_{-1})$
$F_0^{\text{ff}} - 15F_2^{\text{ff}} + 3F_4^{\text{ff}} + 15F_6^{\text{ff}}$	$(f_1f_3 f_1f_3), (f_1f_{-3} f_1f_{-3}), (f_{-1}f_3 f_{-1}f_3), (f_{-1}f_{-3} f_{-1}f_{-3}),$ $(f_3f_1 f_3f_1), (f_3f_{-1} f_3f_{-1}), (f_{-3}f_1 f_{-3}f_1), (f_{-3}f_{-1} f_{-3}f_{-1})$
$F_0^{\text{ff}} - 20F_2^{\text{ff}} + 18F_4^{\text{ff}} - 20F_6^{\text{ff}}$	$(f_0f_3 f_0f_3), (f_0f_{-3} f_0f_{-3}), (f_3f_0 f_3f_0), (f_{-3}f_0 f_{-3}f_0)$
$F_0^{\text{ff}} - 21F_2^{\text{ff}} - 6F_4^{\text{ff}}$	$(f_2f_3 f_2f_3), (f_2f_{-3} f_2f_{-3}), (f_{-2}f_3 f_{-2}f_3), (f_{-2}f_{-3} f_{-2}f_{-3}),$ $(f_3f_2 f_3f_2), (f_3f_{-2} f_3f_{-2}), (f_{-3}f_2 f_{-3}f_2), (f_{-3}f_{-2} f_{-3}f_{-2})$
$10F_2^{\text{ff}} + 54F_4^{\text{ff}} + 28F_6^{\text{ff}}$	$(f_1f_{-1} f_3f_{-3}), (f_{-1}f_1 f_{-3}f_3), (f_1f_3 f_3f_1), (f_{-1}f_{-3} f_{-3}f_{-1}),$ $(f_3f_1 f_1f_3), (f_{-3}f_{-1} f_{-1}f_{-3}), (f_3f_{-3} f_1f_{-1}), (f_{-3}f_3 f_{-1}f_1)$
$14F_4^{\text{ff}} + 378F_6^{\text{ff}}$	$(f_1f_{-2} f_{-2}f_1), (f_{-1}f_2 f_2f_{-1}), (f_2f_{-1} f_{-1}f_2), (f_{-2}f_1 f_1f_{-2})$
$-14F_4^{\text{ff}} - 378F_6^{\text{ff}}$	$(f_1f_{-1} f_{-2}f_2), (f_{-1}f_1 f_2f_{-2}), (f_2f_{-2} f_{-1}f_1), (f_{-2}f_2 f_1f_{-1})$
$15F_2^{\text{ff}} + 32F_4^{\text{ff}} + 105F_6^{\text{ff}}$	$(f_1f_2 f_2f_1), (f_{-1}f_{-2} f_{-2}f_{-1}), (f_2f_1 f_1f_2), (f_{-2}f_{-1} f_{-1}f_{-2})$
$-15F_2^{\text{ff}} - 32F_4^{\text{ff}} - 105F_6^{\text{ff}}$	$(f_1f_{-1} f_2f_{-2}), (f_{-1}f_1 f_{-2}f_2), (f_2f_{-2} f_1f_{-1}), (f_{-2}f_2 f_{-1}f_1)$
$20F_2^{\text{ff}} + 3F_4^{\text{ff}} + 224F_6^{\text{ff}}$	$(f_0f_0 f_2f_{-2}), (f_0f_0 f_{-2}f_2), (f_0f_2 f_2f_0), (f_0f_{-2} f_{-2}f_0),$ $(f_2f_0 f_0f_2), (f_{-2}f_0 f_0f_{-2}), (f_2f_{-2} f_0f_0), (f_{-2}f_2 f_0f_0)$
$20F_2^{\text{ff}} + 3F_4^{\text{ff}} + 224F_6^{\text{ff}}$	$(f_0f_0 f_2f_{-2}), (f_0f_0 f_{-2}f_2), (f_0f_2 f_2f_0), (f_0f_{-2} f_{-2}f_0),$ $(f_2f_0 f_0f_2), (f_{-2}f_0 f_0f_{-2}), (f_2f_{-2} f_0f_0), (f_{-2}f_2 f_0f_0)$

(continued)

Table A.11 (continued)

Formulas	Integrals
$20F_2^{ff} + 3F_4^{ff} + 224F_6^{ff}$	$(f_0f_0 \mid f_2f_{-2}), (f_0f_0 \mid f_{-2}f_2), (f_0f_2 \mid f_2f_0), (f_0f_{-2} \mid f_{-2}f_0),$ $(f_2f_0 \mid f_0f_2), (f_{-2}f_0 \mid f_0f_{-2}), (f_2f_{-2} \mid f_0f_0), (f_{-2}f_2 \mid f_0f_0)$
$24F_2^{ff} + 40F_4^{ff} + 420F_6^{ff}$	$(f_1f_{-1} \mid f_{-1}f_1), (f_{-1}f_1 \mid f_1f_{-1})$
$25F_2^{ff} + 30F_4^{ff} + 7F_6^{ff}$	$(f_2f_3 \mid f_3f_2), (f_{-2}f_{-3} \mid f_{-3}f_{-2}), (f_3f_2 \mid f_2f_3), (f_{-3}f_{-2} \mid f_{-2}f_{-3})$
$-25F_2^{ff} - 30F_4^{ff} - 7F_6^{ff}$	$(f_2f_{-2} \mid f_3f_{-3}), (f_{-2}f_2 \mid f_{-3}f_3), (f_3f_{-3} \mid f_2f_{-2}), (f_{-3}f_3 \mid f_{-2}f_{-2})$
$2F_2^{ff} + 15F_4^{ff} + 350F_6^{ff}$	$(f_0f_1 \mid f_1f_0), (f_0f_{-1} \mid f_{-1}f_0), (f_1f_0 \mid f_0f_1), (f_{-1}f_0 \mid f_0f_{-1})$
$-2F_2^{ff} - 15F_4^{ff} - 350F_6^{ff}$	$(f_0f_0 \mid f_1f_{-1}), (f_0f_0 \mid f_{-1}f_1), (f_1f_{-1} \mid f_0f_0), (f_{-1}f_1 \mid f_0f_0)$
$42F_4^{ff} + 210F_6^{ff}$	$(f_1f_{-1} \mid f_{-3}f_3), (f_{-1}f_1 \mid f_3f_{-3}), (f_1f_{-3} \mid f_{-3}f_1), (f_{-1}f_3 \mid f_3f_{-1}),$ $(f_3f_{-1} \mid f_{-1}f_3), (f_{-3}f_1 \mid f_1f_{-3}), (f_3f_{-3} \mid f_{-1}f_1), (f_{-3}f_3 \mid f_1f_{-1})$
$462F_6^{ff}$	$(f_2f_{-3} \mid f_{-3}f_2), (f_{-2}f_3 \mid f_3f_{-2}), (f_3f_{-2} \mid f_{-2}f_3), (f_{-3}f_2 \mid f_2f_{-3})$
$-462F_6^{ff}$	$(f_2f_{-2} \mid f_{-3}f_3), (f_{-2}f_2 \mid f_3f_{-3}), (f_3f_{-3} \mid f_{-2}f_2), (f_{-3}f_3 \mid f_2f_{-2})$
$63F_4^{ff} + 84F_6^{ff}$	$(f_0f_3 \mid f_3f_0), (f_0f_{-3} \mid f_{-3}f_0), (f_3f_0 \mid f_0f_3), (f_{-3}f_0 \mid f_0f_{-3})$
$-63F_4^{ff} - 84F_6^{ff}$	$(f_0f_0 \mid f_3f_{-3}), (f_0f_0 \mid f_{-3}f_3), (f_3f_{-3} \mid f_0f_0), (f_{-3}f_3 \mid f_0f_0)$
$70F_4^{ff} + 504F_6^{ff}$	$(f_2f_{-2} \mid f_{-2}f_2), (f_{-2}f_2 \mid f_2f_{-2})$
$924F_6^{ff}$	$(f_3f_{-3} \mid f_{-3}f_3), (f_{-3}f_3 \mid f_3f_{-3})$
$4\sqrt{15}F_2^{ff} - 12\sqrt{15}F_4^{ff} - 28\sqrt{15}F_6^{ff}$	$(f_1f_1 \mid f_{-1}f_3), (f_{-1}f_{-1} \mid f_1f_{-3}), (f_1f_1 \mid f_3f_{-1}), (f_{-1}f_{-1} \mid f_{-3}f_1),$ $(f_1f_{-3} \mid f_{-1}f_{-1}), (f_{-1}f_3 \mid f_1f_1), (f_3f_{-1} \mid f_1f_1), (f_{-3}f_1 \mid f_{-1}f_{-1})$
$4\sqrt{30}F_2^{ff} + 2\sqrt{30}F_4^{ff} - 56\sqrt{30}F_6^{ff}$	$(f_0f_1 \mid f_2f_{-1}), (f_0f_{-1} \mid f_{-2}f_1), (f_1f_0 \mid f_{-1}f_2), (f_{-1}f_0 \mid f_1f_{-2}),$ $(f_1f_{-2} \mid f_{-1}f_0), (f_{-1}f_2 \mid f_1f_0), (f_2f_{-1} \mid f_0f_1), (f_{-2}f_1 \mid f_0f_{-1})$
$5\sqrt{15}F_2^{ff} - 8\sqrt{15}F_4^{ff} - 7\sqrt{15}F_6^{ff}$	$(f_1f_3 \mid f_2f_2), (f_{-1}f_{-3} \mid f_{-2}f_{-2}), (f_2f_2 \mid f_1f_3), (f_{-2}f_{-2} \mid f_{-1}f_{-3}),$ $(f_2f_2 \mid f_3f_1), (f_{-2}f_{-2} \mid f_{-3}f_{-1}), (f_3f_1 \mid f_2f_2), (f_{-3}f_{-1} \mid f_{-2}f_{-2})$
$-5\sqrt{15}F_2^{ff} + 8\sqrt{15}F_4^{ff} + 7\sqrt{15}F_6^{ff}$	$(f_1f_{-2} \mid f_2f_{-3}), (f_{-1}f_2 \mid f_{-2}f_3), (f_2f_{-1} \mid f_3f_{-2}), (f_{-2}f_1 \mid f_{-3}f_2),$ $(f_2f_{-3} \mid f_1f_{-2}), (f_{-2}f_3 \mid f_{-1}f_2), (f_3f_{-2} \mid f_2f_{-1}), (f_{-3}f_2 \mid f_{-2}f_1)$
$5\sqrt{2}F_2^{ff} - 15\sqrt{2}F_4^{ff} + 35\sqrt{2}F_6^{ff}$	$(f_0f_3 \mid f_1f_2), (f_0f_{-3} \mid f_{-1}f_{-2}), (f_1f_2 \mid f_0f_3), (f_{-1}f_{-2} \mid f_0f_{-3}),$ $(f_2f_1 \mid f_3f_0), (f_{-2}f_{-1} \mid f_{-3}f_0), (f_3f_0 \mid f_2f_1), (f_{-3}f_0 \mid f_{-2}f_{-1})$
$-5\sqrt{2}F_2^{ff} + 15\sqrt{2}F_4^{ff} - 35\sqrt{2}F_6^{ff}$	$(f_0f_2 \mid f_{-1}f_3), (f_0f_{-2} \mid f_1f_{-3}), (f_1f_{-3} \mid f_0f_{-2}), (f_{-1}f_3 \mid f_0f_2),$ $(f_2f_0 \mid f_3f_{-1}), (f_{-2}f_0 \mid f_{-3}f_1), (f_3f_{-1} \mid f_2f_0), (f_{-3}f_1 \mid f_{-2}f_0)$
$\sqrt{30}F_2^{ff} + 4\sqrt{30}F_4^{ff} - 35\sqrt{30}F_6^{ff}$	$(f_0f_2 \mid f_1f_1), (f_0f_{-2} \mid f_{-1}f_{-1}), (f_1f_1 \mid f_0f_2), (f_{-1}f_{-1} \mid f_0f_{-2}),$ $(f_1f_1 \mid f_2f_0), (f_{-1}f_{-1} \mid f_{-2}f_0), (f_2f_0 \mid f_1f_1), (f_{-2}f_0 \mid f_{-1}f_{-1})$
$-\sqrt{30}F_2^{ff} - 4\sqrt{30}F_4^{ff} + 35\sqrt{30}F_6^{ff}$	$(f_0f_1 \mid f_{-1}f_2), (f_0f_{-1} \mid f_1f_{-2}), (f_1f_0 \mid f_2f_{-1}), (f_{-1}f_0 \mid f_{-2}f_1),$ $(f_1f_{-2} \mid f_0f_{-1}), (f_{-1}f_2 \mid f_0f_1), (f_2f_{-1} \mid f_1f_0), (f_{-2}f_1 \mid f_{-1}f_0)$
$10\sqrt{2}F_2^{ff} - 9\sqrt{2}F_4^{ff} - 56\sqrt{2}F_6^{ff}$	$(f_0f_1 \mid f_{-2}f_3), (f_0f_{-1} \mid f_2f_{-3}), (f_0f_3 \mid f_2f_1), (f_0f_{-3} \mid f_{-2}f_{-1}),$ $(f_1f_0 \mid f_3f_{-2}), (f_{-1}f_0 \mid f_{-3}f_2), (f_1f_2 \mid f_3f_0), (f_{-1}f_{-2} \mid f_{-3}f_0),$ $(f_2f_1 \mid f_0f_3), (f_{-2}f_{-1} \mid f_0f_{-3}), (f_2f_{-3} \mid f_0f_{-1}), (f_{-2}f_3 \mid f_0f_1),$ $(f_3f_0 \mid f_1f_2), (f_{-3}f_0 \mid f_{-1}f_{-2}), (f_3f_{-2} \mid f_1f_0), (f_{-3}f_2 \mid f_{-1}f_0)$

(continued)

Table A.11 (continued)

Formulas	Integrals
$21\sqrt{2}F_4^{ff} - 126\sqrt{2}F_6^{ff}$	$(f_0f_2 \mid f_3f_{-1}), (f_0f_{-2} \mid f_{-3}f_1), (f_1f_{-3} \mid f_{-2}f_0), (f_{-1}f_3 \mid f_2f_0),$ $(f_2f_0 \mid f_{-1}f_3), (f_{-2}f_0 \mid f_1f_{-3}), (f_3f_{-1} \mid f_0f_2), (f_{-3}f_1 \mid f_0f_{-2})$
$-21\sqrt{2}F_4^{ff} + 126\sqrt{2}F_6^{ff}$	$(f_0f_1 \mid f_3f_{-2}), (f_0f_{-1} \mid f_{-3}f_2), (f_1f_0 \mid f_{-2}f_3), (f_{-1}f_0 \mid f_2f_{-3}),$ $(f_2f_{-3} \mid f_{-1}f_0), (f_{-2}f_3 \mid f_1f_0), (f_3f_{-2} \mid f_0f_1), (f_{-3}f_2 \mid f_0f_{-1})$
$14\sqrt{15}F_4^{ff} - 84\sqrt{15}F_6^{ff}$	$(f_1f_{-2} \mid f_{-3}f_2), (f_{-1}f_2 \mid f_3f_{-2}), (f_2f_{-1} \mid f_{-2}f_3), (f_{-2}f_1 \mid f_2f_{-3}),$ $(f_2f_{-3} \mid f_{-2}f_1), (f_{-2}f_3 \mid f_2f_{-1}), (f_3f_{-2} \mid f_{-1}f_2), (f_{-3}f_2 \mid f_1f_{-2})$

Table A.12 Two-electron integrals made with s- and f-type orbitals; here $F^0(sf) = F_0^{sf}$, $G^1(sf) = 7G_1^{sf}$

Formulas	Integrals
F_0^{sf}	$(f_0s_0 \mid f_0s_0), (f_{-1}s_0 \mid f_{-1}s_0), (f_1s_0 \mid f_1s_0), (f_{-2}s_0 \mid f_{-2}s_0),$ $(f_2s_0 \mid f_2s_0), (f_{-3}s_0 \mid f_{-3}s_0), (f_3s_0 \mid f_3s_0), (s_0f_0 \mid s_0f_0),$ $(s_0f_{-1} \mid s_0f_{-1}), (s_0f_1 \mid s_0f_1), (s_0f_{-2} \mid s_0f_{-2}), (s_0f_2 \mid s_0f_2),$ $(s_0f_{-3} \mid s_0f_{-3}), (s_0f_3 \mid s_0f_3)$
G_1^{sf}	$(f_0f_0 \mid s_0s_0), (f_0s_0 \mid s_0f_0), (f_{-1}s_0 \mid s_0f_{-1}), (f_1s_0 \mid s_0f_1),$ $(f_2f_{-2} \mid s_0s_0), (f_{-2}f_2 \mid s_0s_0), (f_{-2}s_0 \mid s_0f_{-2}), (f_2s_0 \mid s_0f_2),$ $(f_{-3}s_0 \mid s_0f_{-3}), (f_3s_0 \mid s_0f_3), (s_0f_0 \mid f_0s_0), (s_0f_{-1} \mid f_{-1}s_0),$ $(s_0f_1 \mid f_1s_0), (s_0f_{-2} \mid f_{-2}s_0), (s_0f_2 \mid f_2s_0), (s_0f_{-3} \mid f_{-3}s_0),$ $(s_0f_3 \mid f_3s_0), (s_0s_0 \mid f_0f_0), (s_0s_0 \mid f_2f_{-2}), (s_0s_0 \mid f_{-2}f_2)$
$-G_1^{sf}$	$(f_1f_{-1} \mid s_0s_0), (f_{-1}f_1 \mid s_0s_0), (f_3f_{-3} \mid s_0s_0), (f_{-3}f_3 \mid s_0s_0),$ $(s_0s_0 \mid f_1f_{-1}), (s_0s_0 \mid f_{-1}f_1), (s_0s_0 \mid f_3f_{-3}), (s_0s_0 \mid f_{-3}f_3)$

Table A.13 Two-electron integrals made with d- and f-type orbitals; here $F^0(\text{fd}) = F_0^{\text{fd}}$, $F^2(\text{fd}) = 105F_2^{\text{fd}}$, $F^4(\text{fd}) = 693F_4^{\text{fd}}$, $G^1(\text{fd}) = 35G_1^{\text{fd}}$, $G^3(\text{fd}) = 315G_3^{\text{fd}}$, $G^5(\text{fd}) = \left(\frac{7623}{5}\right)G_5^{\text{fd}}$

$F_0^{\text{fd}} + 10F_2^{\text{fd}} + 3F_4^{\text{fd}}$	(d ₋₂ f ₋₃ d ₋₂ f ₋₃), (d ₂ f ₋₃ d ₂ f ₋₃), (d ₋₂ f ₃ d ₋₂ f ₃), (d ₂ f ₃ d ₂ f ₃), (f ₋₃ d ₋₂ f ₋₃ d ₋₂), (f ₃ d ₋₂ f ₃ d ₋₂), (f ₋₃ d ₂ f ₋₃ d ₂), (f ₃ d ₂ f ₃ d ₂)
$F_0^{\text{fd}} + 28F_4^{\text{fd}}$	(d ₋₁ f ₋₂ d ₋₁ f ₋₂), (d ₁ f ₋₂ d ₁ f ₋₂), (d ₋₁ f ₂ d ₋₁ f ₂), (d ₁ f ₂ d ₁ f ₂), (f ₋₂ d ₋₁ f ₋₂ d ₋₁), (f ₂ d ₋₁ f ₂ d ₋₁), (f ₋₂ d ₁ f ₋₂ d ₁), (f ₂ d ₁ f ₂ d ₁)
$F_0^{\text{fd}} + 3F_2^{\text{fd}} - 4F_4^{\text{fd}}$	(d ₋₁ f ₋₁ d ₋₁ f ₋₁), (d ₁ f ₋₁ d ₁ f ₋₁), (d ₋₁ f ₁ d ₋₁ f ₁), (d ₁ f ₁ d ₁ f ₁), (f ₋₁ d ₋₁ f ₋₁ d ₋₁), (f ₁ d ₋₁ f ₁ d ₋₁), (f ₋₁ d ₁ f ₋₁ d ₁), (f ₁ d ₁ f ₁ d ₁)
$F_0^{\text{fd}} + 4F_2^{\text{fd}} - 24F_4^{\text{fd}}$	(d ₋₁ f ₀ d ₋₁ f ₀), (d ₁ f ₀ d ₁ f ₀), (f ₀ d ₋₁ f ₀ d ₋₁), (f ₀ d ₁ f ₀ d ₁)
$F_0^{\text{fd}} + 6F_2^{\text{fd}} + 6F_4^{\text{fd}}$	(d ₀ f ₋₁ d ₀ f ₋₁), (d ₀ f ₁ d ₀ f ₁), (f ₋₁ d ₀ f ₋₁ d ₀), (f ₁ d ₀ f ₁ d ₀)
$F_0^{\text{fd}} + 8F_2^{\text{fd}} + 36F_4^{\text{fd}}$	(d ₀ f ₀ d ₀ f ₀), (f ₀ d ₀ f ₀ d ₀)
$F_0^{\text{fd}} - 10F_2^{\text{fd}} + 18F_4^{\text{fd}}$	(d ₀ f ₋₃ d ₀ f ₋₃), (d ₀ f ₃ d ₀ f ₃), (f ₋₃ d ₀ f ₋₃ d ₀), (f ₃ d ₀ f ₃ d ₀)
$F_0^{\text{fd}} - 42F_4^{\text{fd}}$	(d ₀ f ₋₂ d ₀ f ₋₂), (d ₀ f ₂ d ₀ f ₂), (f ₋₂ d ₀ f ₋₂ d ₀), (f ₂ d ₀ f ₂ d ₀)
$F_0^{\text{fd}} - 5F_2^{\text{fd}} - 12F_4^{\text{fd}}$	(d ₋₁ f ₋₃ d ₋₁ f ₋₃), (d ₁ f ₋₃ d ₁ f ₋₃), (d ₋₁ f ₃ d ₋₁ f ₃), (d ₁ f ₃ d ₁ f ₃), (f ₋₃ d ₋₁ f ₋₃ d ₋₁), (f ₃ d ₋₁ f ₃ d ₋₁), (f ₋₃ d ₁ f ₋₃ d ₁), (f ₃ d ₁ f ₃ d ₁)
$F_0^{\text{fd}} - 6F_2^{\text{fd}} + F_4^{\text{fd}}$	(d ₋₂ f ₋₁ d ₋₂ f ₋₁), (d ₂ f ₋₁ d ₂ f ₋₁), (d ₋₂ f ₁ d ₋₂ f ₁), (d ₂ f ₁ d ₂ f ₁), (f ₋₁ d ₋₂ f ₋₁ d ₋₂), (f ₁ d ₋₂ f ₁ d ₋₂), (f ₋₁ d ₂ f ₋₁ d ₂), (f ₁ d ₂ f ₁ d ₂)
$F_0^{\text{fd}} - 7F_4^{\text{fd}}$	(d ₋₂ f ₋₂ d ₋₂ f ₋₂), (d ₂ f ₋₂ d ₂ f ₋₂), (d ₋₂ f ₂ d ₋₂ f ₂), (d ₂ f ₂ d ₂ f ₂), (f ₋₂ d ₋₂ f ₋₂ d ₋₂), (f ₂ d ₋₂ f ₂ d ₋₂), (f ₋₂ d ₂ f ₋₂ d ₂), (f ₂ d ₂ f ₂ d ₂)
$F_0^{\text{fd}} - 8F_2^{\text{fd}} + 6F_4^{\text{fd}}$	(d ₋₂ f ₀ d ₋₂ f ₀), (d ₂ f ₀ d ₂ f ₀), (f ₀ d ₋₂ f ₀ d ₋₂), (f ₀ d ₂ f ₀ d ₂)
$12F_2^{\text{fd}} + 40F_4^{\text{fd}}$	(d ₁ f ₋₁ d ₁ f ₋₁), (d ₋₁ f ₁ d ₋₁ f ₁), (f ₋₁ d ₁ f ₋₁ d ₁), (f ₁ d ₋₁ f ₁ d ₋₁)
$5F_2^{\text{fd}} - 30F_4^{\text{fd}}$	(d ₀ f ₋₃ d ₋₁ f ₋₂), (d ₀ f ₃ d ₁ f ₂), (d ₋₁ f ₋₂ d ₀ f ₋₃), (d ₁ f ₂ d ₀ f ₃), (f ₋₂ d ₋₁ f ₋₃ d ₀), (f ₂ d ₁ f ₃ d ₀), (f ₋₃ d ₀ f ₋₂ d ₋₁), (f ₃ d ₀ f ₂ d ₁)
$-5F_2^{\text{fd}} + 30F_4^{\text{fd}}$	(d ₀ f ₋₂ d ₁ f ₋₃), (d ₀ f ₂ d ₋₁ f ₃), (d ₁ f ₋₃ d ₀ f ₋₂), (d ₋₁ f ₃ d ₀ f ₂), (f ₋₂ d ₀ f ₋₃ d ₁), (f ₂ d ₀ f ₃ d ₋₁), (f ₋₃ d ₁ f ₋₂ d ₀), (f ₃ d ₋₁ f ₂ d ₀)
$70F_4^{\text{fd}}$	(d ₂ f ₋₂ d ₋₂ f ₂), (d ₋₂ f ₂ d ₂ f ₋₂), (f ₂ d ₋₂ f ₋₂ d ₂), (f ₋₂ d ₂ f ₂ d ₋₂)
$14\sqrt{15}F_4^{\text{fd}}$	(d ₂ f ₋₁ d ₋₂ f ₃), (d ₋₂ f ₁ d ₂ f ₋₃), (d ₂ f ₋₃ d ₋₂ f ₁), (d ₋₂ f ₃ d ₂ f ₋₁), (f ₁ d ₋₂ f ₋₃ d ₂), (f ₋₁ d ₂ f ₃ d ₋₂), (f ₃ d ₋₂ f ₋₁ d ₂), (f ₋₃ d ₂ f ₁ d ₋₂)
$2\sqrt{15}F_2^{\text{fd}} + 9\sqrt{10}F_4^{\text{fd}}$	(d ₀ f ₋₁ d ₂ f ₋₃), (d ₀ f ₁ d ₋₂ f ₃), (d ₀ f ₋₃ d ₋₂ f ₋₁), (d ₀ f ₃ d ₂ f ₁), (d ₋₂ f ₋₁ d ₀ f ₋₃), (d ₂ f ₁ d ₀ f ₃), (d ₂ f ₋₃ d ₀ f ₋₁), (d ₋₂ f ₃ d ₀ f ₁), (f ₋₁ d ₀ f ₋₃ d ₂), (f ₁ d ₀ f ₃ d ₋₂), (f ₋₁ d ₋₂ f ₋₃ d ₀), (f ₁ d ₂ f ₃ d ₀), (f ₋₃ d ₀ f ₋₁ d ₋₂), (f ₃ d ₀ f ₁ d ₂), (f ₋₃ d ₂ f ₋₁ d ₀), (f ₃ d ₋₂ f ₁ d ₀)
$2\sqrt{15}F_2^{\text{fd}} - 12\sqrt{15}F_4^{\text{fd}}$	(d ₋₁ f ₋₁ d ₁ f ₋₃), (d ₁ f ₋₁ d ₋₁ f ₃), (d ₁ f ₋₃ d ₋₁ f ₋₁), (d ₋₁ f ₃ d ₁ f ₋₁), (f ₋₁ d ₋₁ f ₋₃ d ₁), (f ₁ d ₋₁ f ₃ d ₋₁), (f ₋₃ d ₁ f ₋₁ d ₋₁), (f ₃ d ₋₁ f ₁ d ₋₁)
$2\sqrt{3}F_2^{\text{fd}} - 5\sqrt{3}F_4^{\text{fd}}$	(d ₋₁ f ₋₁ d ₋₂ f ₀), (d ₁ f ₁ d ₂ f ₀), (d ₋₂ f ₀ d ₋₁ f ₋₁), (d ₂ f ₀ d ₁ f ₁), (f ₀ d ₋₂ f ₋₁ d ₋₁), (f ₀ d ₂ f ₁ d ₁), (f ₋₁ d ₋₁ f ₀ d ₋₂), (f ₁ d ₁ f ₀ d ₂)
$-2\sqrt{3}F_2^{\text{fd}} + 5\sqrt{3}F_4^{\text{fd}}$	(d ₋₁ f ₀ d ₋₂ f ₁), (d ₁ f ₀ d ₂ f ₋₁), (d ₋₂ f ₁ d ₋₁ f ₀), (d ₂ f ₋₁ d ₁ f ₀), (f ₀ d ₋₁ f ₁ d ₋₂), (f ₀ d ₁ f ₋₁ d ₂), (f ₁ d ₋₂ f ₀ d ₋₁), (f ₋₁ d ₂ f ₀ d ₁)
$2\sqrt{30}F_2^{\text{fd}} + 2\sqrt{30}F_4^{\text{fd}}$	(d ₋₁ f ₀ d ₁ f ₋₂), (d ₁ f ₀ d ₋₁ f ₂), (d ₁ f ₋₂ d ₋₁ f ₀), (d ₋₁ f ₂ d ₁ f ₀), (f ₀ d ₋₁ f ₋₂ d ₁), (f ₀ d ₁ f ₂ d ₋₁), (f ₋₂ d ₁ f ₀ d ₋₁), (f ₂ d ₋₁ f ₀ d ₁)
$3\sqrt{10}F_2^{\text{fd}} - 4\sqrt{10}F_4^{\text{fd}}$	(d ₋₁ f ₋₂ d ₋₂ f ₋₁), (d ₁ f ₂ d ₂ f ₋₁), (d ₋₂ f ₋₁ d ₋₁ f ₋₂), (d ₂ f ₋₁ d ₁ f ₂), (f ₋₁ d ₋₂ f ₋₂ d ₋₁), (f ₁ d ₂ f ₂ d ₋₁), (f ₋₂ d ₋₁ f ₋₁ d ₋₂), (f ₂ d ₋₁ f ₁ d ₂)

(continued)

Table A.13 (continued)

$-3\sqrt{10}F_2^{\text{fd}} + 4\sqrt{10}F_4^{\text{fd}}$	$(d_1f_{-1} \mid d_2f_{-2}), (d_{-1}f_1 \mid d_{-2}f_2), (d_2f_{-2} \mid d_1f_{-1}), (d_{-2}f_2 \mid d_{-1}f_1),$ $(f_1d_{-1} \mid f_2d_{-2}), (f_{-1}d_1 \mid f_{-2}d_2), (f_2d_{-2} \mid f_1d_{-1}), (f_{-2}d_2 \mid f_{-1}d_1)$
$4\sqrt{5}F_2^{\text{fd}} - 3\sqrt{5}F_4^{\text{fd}}$	$(d_0f_0 \mid d_2f_{-2}), (d_0f_0 \mid d_{-2}f_2), (d_0f_{-2} \mid d_{-2}f_0), (d_0f_2 \mid d_2f_0),$ $(d_{-2}f_0 \mid d_0f_{-2}), (d_2f_0 \mid d_0f_2), (d_2f_{-2} \mid d_0f_0), (d_{-2}f_2 \mid d_0f_0),$ $(f_0d_0 \mid f_2d_{-2}), (f_0d_0 \mid f_{-2}d_2), (f_0d_{-2} \mid f_{-2}d_0), (f_0d_2 \mid f_2d_0),$ $(f_{-2}d_0 \mid f_0d_{-2}), (f_2d_0 \mid f_0d_2), (f_2d_{-2} \mid f_0d_0), (f_{-2}d_2 \mid f_0d_0)$
$4\sqrt{6}F_2^{\text{fd}} - 10\sqrt{6}F_4^{\text{fd}}$	$(d_0f_{-1} \mid d_{-2}f_1), (d_0f_1 \mid d_2f_{-1}), (d_{-2}f_1 \mid d_0f_{-1}), (d_2f_{-1} \mid d_0f_1),$ $(f_{-1}d_0 \mid f_1d_{-2}), (f_1d_0 \mid f_{-1}d_2), (f_1d_{-2} \mid f_{-1}d_0), (f_{-1}d_2 \mid f_1d_0)$
$5\sqrt{6}F_2^{\text{fd}} + 5\sqrt{6}F_4^{\text{fd}}$	$(d_{-1}f_{-3} \mid d_{-2}f_{-2}), (d_1f_3 \mid d_2f_2), (d_{-2}f_{-2} \mid d_{-1}f_{-3}), (d_2f_2 \mid d_1f_3),$ $(f_{-2}d_{-2} \mid f_{-3}d_{-1}), (f_2d_2 \mid f_3d_1), (f_{-3}d_{-1} \mid f_{-2}d_{-2}), (f_3d_1 \mid f_2d_2)$
$-5\sqrt{6}F_2^{\text{fd}} - 5\sqrt{6}F_4^{\text{fd}}$	$(d_1f_{-2} \mid d_2f_{-3}), (d_{-1}f_2 \mid d_{-2}f_3), (d_2f_{-3} \mid d_1f_{-2}), (d_{-2}f_3 \mid d_{-1}f_2),$ $(f_2d_{-1} \mid f_3d_{-2}), (f_{-2}d_1 \mid f_{-3}d_2), (f_3d_{-2} \mid f_2d_{-1}), (f_{-3}d_2 \mid f_{-2}d_1)$
$7\sqrt{10}F_4^{\text{fd}}$	$(d_1f_{-2} \mid d_{-2}f_1), (d_{-1}f_2 \mid d_2f_{-1}), (d_2f_{-1} \mid d_{-1}f_2), (d_{-2}f_1 \mid d_1f_{-2}),$ $(f_1d_{-2} \mid f_{-2}d_1), (f_{-1}d_2 \mid f_2d_{-1}), (f_2d_{-1} \mid f_1d_{-2}), (f_{-2}d_1 \mid f_{-1}d_2)$
$-7\sqrt{10}F_4^{\text{fd}}$	$(d_1f_{-1} \mid d_{-2}f_2), (d_{-1}f_1 \mid d_2f_{-2}), (d_2f_{-2} \mid d_{-1}f_1), (d_{-2}f_2 \mid d_1f_{-1}),$ $(f_1d_{-1} \mid f_{-2}d_2), (f_{-1}d_1 \mid f_2d_{-2}), (f_2d_{-2} \mid f_{-1}d_1), (f_{-2}d_2 \mid f_1d_{-1})$
$\sqrt{15}F_2^{\text{fd}} + 8\sqrt{15}F_4^{\text{fd}}$	$(d_0f_{-2} \mid d_{-1}f_{-1}), (d_0f_2 \mid d_1f_1), (d_{-1}f_{-1} \mid d_0f_{-2}), (d_1f_1 \mid d_0f_2),$ $(f_{-1}d_{-1} \mid f_{-2}d_0), (f_1d_1 \mid f_2d_0), (f_{-2}d_0 \mid f_{-1}d_{-1}), (f_2d_0 \mid f_1d_1)$
$-\sqrt{15}F_2^{\text{fd}} - 8\sqrt{15}F_4^{\text{fd}}$	$(d_0f_{-1} \mid d_1f_{-2}), (d_0f_1 \mid d_{-1}f_2), (d_1f_{-2} \mid d_0f_{-1}), (d_{-1}f_2 \mid d_0f_1),$ $(f_{-1}d_0 \mid f_{-2}d_1), (f_1d_0 \mid f_2d_{-1}), (f_{-2}d_1 \mid f_{-1}d_0), (f_2d_{-1} \mid f_1d_0)$
$\sqrt{2}F_2^{\text{fd}} + 15\sqrt{2}F_4^{\text{fd}}$	$(d_0f_{-1} \mid d_{-1}f_0), (d_0f_1 \mid d_1f_0), (d_{-1}f_0 \mid d_0f_{-1}), (d_1f_0 \mid d_0f_1),$ $(f_0d_{-1} \mid f_{-1}d_0), (f_0d_1 \mid f_1d_0), (f_{-1}d_0 \mid f_0d_{-1}), (f_1d_0 \mid f_0d_1)$
$-\sqrt{2}F_2^{\text{fd}} - 15\sqrt{2}F_4^{\text{fd}}$	$(d_0f_0 \mid d_1f_{-1}), (d_0f_0 \mid d_{-1}f_1), (d_1f_{-1} \mid d_0f_0), (d_{-1}f_1 \mid d_0f_0),$ $(f_0d_0 \mid f_1d_{-1}), (f_0d_0 \mid f_{-1}d_1), (f_1d_{-1} \mid f_0d_0), (f_{-1}d_1 \mid f_0d_0)$
$21\sqrt{5}F_4^{\text{fd}}$	$(d_1f_{-3} \mid d_{-2}f_0), (d_{-1}f_3 \mid d_2f_0), (d_{-2}f_0 \mid d_1f_{-3}), (d_2f_0 \mid d_{-1}f_3),$ $(f_0d_{-2} \mid f_{-3}d_1), (f_0d_2 \mid f_3d_{-1}), (f_{-3}d_1 \mid f_0d_{-2}), (f_3d_{-1} \mid f_0d_2)$
$-21\sqrt{5}F_4^{\text{fd}}$	$(d_{-1}f_0 \mid d_2f_{-3}), (d_1f_0 \mid d_{-2}f_3), (d_2f_{-3} \mid d_{-1}f_0), (d_{-2}f_3 \mid d_1f_0),$ $(f_0d_{-1} \mid f_{-3}d_2), (f_0d_1 \mid f_3d_{-2}), (f_{-3}d_2 \mid f_0d_{-1}), (f_3d_{-2} \mid f_0d_1)$
$10G_1^{\text{fd}} + 15G_3^{\text{fd}} + 24G_5^{\text{fd}}$	$(d_{-1}f_{-2} \mid f_{-2}d_{-1}), (d_1f_2 \mid f_2d_1), (f_{-2}d_{-1} \mid d_{-1}f_{-2}), (f_2d_1 \mid d_1f_2)$
$-10G_1^{\text{fd}} - 15G_3^{\text{fd}} - 24G_5^{\text{fd}}$	$(d_1d_{-1} \mid f_2f_{-2}), (d_{-1}d_1 \mid f_{-2}f_2), (f_2f_{-2} \mid d_1d_{-1}), (f_{-2}f_2 \mid d_{-1}d_1)$
$10G_3^{\text{fd}} + 70G_5^{\text{fd}}$	$(d_2f_{-1} \mid f_{-1}d_2), (d_{-2}f_1 \mid f_1d_{-2}), (f_1d_{-2} \mid d_{-2}f_{-1}), (f_{-1}d_2 \mid d_2f_{-1})$
$-10G_3^{\text{fd}} - 70G_5^{\text{fd}}$	$(d_2d_{-2} \mid f_{-1}f_1), (d_{-2}d_2 \mid f_1f_{-1}), (f_1f_{-1} \mid d_2d_{-2}), (f_{-1}f_1 \mid d_{-2}d_2)$
$126G_5^{\text{fd}}$	$(d_2d_{-2} \mid f_{-2}f_2), (d_{-2}d_2 \mid f_2f_{-2}), (d_2f_{-2} \mid f_{-2}d_2), (d_{-2}f_2 \mid f_2d_{-2}),$ $(f_2d_{-2} \mid d_{-2}f_2), (f_{-2}d_2 \mid d_2f_{-2}), (f_2f_{-2} \mid d_2d_2), (f_{-2}f_2 \mid d_{-2}d_{-2})$
$15G_1^{\text{fd}} + 10G_3^{\text{fd}} + G_5^{\text{fd}}$	$(d_{-2}f_{-3} \mid f_{-3}d_{-2}), (d_2f_3 \mid f_3d_2), (f_{-3}d_{-2} \mid d_{-2}f_{-3}), (f_3d_2 \mid d_2f_3)$
$-15G_1^{\text{fd}} - 10G_3^{\text{fd}} - G_5^{\text{fd}}$	$(d_2d_{-2} \mid f_3f_{-3}), (d_{-2}d_2 \mid f_{-3}f_3), (f_3f_{-3} \mid d_2d_{-2}), (f_{-3}f_3 \mid d_{-2}d_2)$
$15G_3^{\text{fd}} + 105G_5^{\text{fd}}$	$(d_1d_{-1} \mid f_{-1}f_1), (d_{-1}d_1 \mid f_1f_{-1}), (d_1f_{-1} \mid f_{-1}d_1), (d_{-1}f_1 \mid f_1d_{-1}),$ $(f_1d_{-1} \mid d_{-1}f_1), (f_{-1}d_1 \mid d_1f_{-1}), (f_1f_{-1} \mid d_{-1}d_1), (f_{-1}f_1 \mid d_1d_{-1})$
$20G_3^{\text{fd}} + 35G_5^{\text{fd}}$	$(d_2d_{-2} \mid f_0f_0), (d_{-2}d_2 \mid f_0f_0), (d_{-2}f_0 \mid f_0d_{-2}), (d_2f_0 \mid f_0d_2),$ $(f_0d_{-2} \mid d_{-2}f_0), (f_0d_2 \mid d_2f_0), (f_0f_0 \mid d_2d_{-2}), (f_0f_0 \mid d_{-2}d_2)$
$210G_5^{\text{fd}}$	$(d_2f_{-3} \mid f_{-3}d_2), (d_{-2}f_3 \mid f_3d_{-2}), (f_3d_{-2} \mid d_{-2}f_3), (f_{-3}d_2 \mid d_2f_{-3})$

(continued)

Table A.13 (continued)

$-210G_5^{\text{fd}}$	$(d_2d_{-2} \mid f_{-3}f_3), (d_{-2}d_2 \mid f_3f_{-3}), (f_3f_{-3} \mid d_{-2}d_2), (f_{-3}f_3 \mid d_2d_{-2})$
$-21G_5^{\text{fd}}$	$(d_0d_{-1} \mid f_2f_{-3}), (d_0d_1 \mid f_{-2}f_3), (d_0f_{-3} \mid f_{-2}d_{-1}), (d_0f_3 \mid f_2d_1),$ $(d_{-1}d_0 \mid f_{-3}f_2), (d_1d_0 \mid f_3f_{-2}), (d_{-1}f_{-2} \mid f_{-3}d_0), (d_1f_2 \mid f_3d_0),$ $(f_{-2}d_{-1} \mid d_0f_{-3}), (f_2d_1 \mid d_0f_3), (f_2f_{-3} \mid d_0d_{-1}), (f_{-2}f_3 \mid d_0d_1),$ $(f_{-3}d_0 \mid d_{-1}f_{-2}), (f_3d_0 \mid d_1f_2), (f_{-3}f_2 \mid d_{-1}d_0), (f_3f_{-2} \mid d_1d_0)$
$25G_3^{\text{fd}} + 112G_5^{\text{fd}}$	$(d_1f_{-2} \mid f_{-2}d_1), (d_{-1}f_2 \mid f_2d_{-1}), (f_2d_{-1} \mid d_{-1}f_2), (f_{-2}d_1 \mid d_1f_{-2})$
$25G_3^{\text{fd}} + 28G_5^{\text{fd}}$	$(d_0f_{-3} \mid f_{-3}d_0), (d_0f_3 \mid f_3d_0), (f_{-3}d_0 \mid d_0f_{-3}), (f_3d_0 \mid d_0f_3)$
$25G_3^{\text{fd}} + 7G_5^{\text{fd}}$	$(d_1d_{-1} \mid f_3f_{-3}), (d_{-1}d_1 \mid f_{-3}f_3), (d_{-1}f_{-3} \mid f_{-3}d_{-1}), (d_1f_3 \mid f_3d_1),$ $(f_{-3}d_{-1} \mid d_{-1}f_{-3}), (f_3d_1 \mid d_1f_3), (f_3f_{-3} \mid d_1d_{-1}), (f_{-3}f_3 \mid d_{-1}d_1)$
$-25G_3^{\text{fd}} - 112G_5^{\text{fd}}$	$(d_1d_{-1} \mid f_{-2}f_2), (d_{-1}d_1 \mid f_2f_{-2}), (f_2f_{-2} \mid d_{-1}d_1), (f_{-2}f_2 \mid d_1d_{-1})$
$-25G_3^{\text{fd}} - 28G_5^{\text{fd}}$	$(d_0d_0 \mid f_3f_{-3}), (d_0d_0 \mid f_{-3}f_3), (f_3f_{-3} \mid d_0d_0), (f_{-3}f_3 \mid d_0d_0)$
$25G_3^{\text{fd}} - 56G_5^{\text{fd}}$	$(d_0f_{-2} \mid f_{-3}d_1), (d_0f_2 \mid f_3d_{-1}), (d_1f_{-3} \mid f_{-2}d_0), (d_{-1}f_3 \mid f_2d_0),$ $(f_{-2}d_0 \mid d_1f_{-3}), (f_2d_0 \mid d_{-1}f_3), (f_{-3}d_1 \mid d_0f_{-2}), (f_3d_{-1} \mid d_0f_2)$
$-25G_3^{\text{fd}} + 56G_5^{\text{fd}}$	$(d_0d_{-1} \mid f_{-3}f_2), (d_0d_1 \mid f_3f_{-2}), (d_{-1}d_0 \mid f_2f_{-3}), (d_1d_0 \mid f_{-2}f_3),$ $(f_2f_{-3} \mid d_{-1}d_0), (f_{-2}f_3 \mid d_1d_0), (f_{-3}f_2 \mid d_0d_{-1}), (f_3f_{-2} \mid d_0d_1)$
$3G_1^{\text{fd}} + 2G_3^{\text{fd}} + 80G_5^{\text{fd}}$	$(d_{-1}f_0 \mid f_0d_{-1}), (d_1f_0 \mid f_0d_1), (f_0d_{-1} \mid d_{-1}f_0), (f_0d_1 \mid d_1f_0)$
$-3G_1^{\text{fd}} - 2G_3^{\text{fd}} - 80G_5^{\text{fd}}$	$(d_1d_{-1} \mid f_0f_0), (d_{-1}d_1 \mid f_0f_0), (f_0f_0 \mid d_1d_{-1}), (f_0f_0 \mid d_{-1}d_1)$
$5G_1^{\text{fd}} + 20G_3^{\text{fd}} + 5G_5^{\text{fd}}$	$(d_{-2}d_{-2} \mid f_{-2}f_{-2}), (d_2d_{-2} \mid f_2f_{-2}), (d_{-2}d_2 \mid f_{-2}f_2), (d_2d_2 \mid f_2f_2),$ $(d_{-2}f_{-2} \mid f_{-2}d_{-2}), (d_2f_{-2} \mid f_2d_{-2}), (d_{-2}f_2 \mid f_{-2}d_2), (d_2f_2 \mid f_2d_2),$ $(f_{-2}d_{-2} \mid d_{-2}f_{-2}), (f_2d_{-2} \mid d_2f_{-2}), (f_{-2}d_2 \mid d_{-2}f_2), (f_2d_2 \mid d_2f_2),$ $(f_{-2}f_{-2} \mid d_{-2}d_{-2}), (f_2f_{-2} \mid d_2d_{-2}), (f_{-2}f_2 \mid d_{-2}d_2), (f_2f_2 \mid d_2d_2)$
$63G_5^{\text{fd}}$	$(d_0d_0 \mid f_2f_{-2}), (d_0d_0 \mid f_{-2}f_2), (d_0f_{-2} \mid f_{-2}d_0), (d_0f_2 \mid f_2d_0),$ $(f_{-2}d_0 \mid d_0f_{-2}), (f_2d_0 \mid d_0f_2), (f_2f_{-2} \mid d_0d_0), (f_{-2}f_2 \mid d_0d_0)$
$6G_1^{\text{fd}} + 9G_3^{\text{fd}} + 90G_5^{\text{fd}}$	$(d_0f_{-1} \mid f_{-1}d_0), (d_0f_1 \mid f_1d_0), (f_{-1}d_0 \mid d_0f_{-1}), (f_1d_0 \mid d_0f_1)$
$-6G_1^{\text{fd}} - 9G_3^{\text{fd}} - 90G_5^{\text{fd}}$	$(d_0d_0 \mid f_1f_{-1}), (d_0d_0 \mid f_{-1}f_1), (f_1f_{-1} \mid d_0d_0), (f_{-1}f_1 \mid d_0d_0)$
$84G_5^{\text{fd}}$	$(d_1d_{-1} \mid f_{-3}f_3), (d_{-1}d_1 \mid f_3f_{-3}), (d_1f_{-3} \mid f_{-3}d_1), (d_{-1}f_3 \mid f_3d_{-1}),$ $(f_3d_{-1} \mid d_{-1}f_3), (f_{-3}d_1 \mid d_1f_{-3}), (f_3f_{-3} \mid d_{-1}d_1), (f_{-3}f_3 \mid d_1d_{-1})$
$8G_1^{\text{fd}} + 2G_3^{\text{fd}} + 50G_5^{\text{fd}}$	$(d_{-1}d_{-1} \mid f_{-1}f_{-1}), (d_1d_{-1} \mid f_1f_{-1}), (d_{-1}d_1 \mid f_{-1}f_1), (d_1d_1 \mid f_1f_1),$ $(d_{-1}f_{-1} \mid f_{-1}d_{-1}), (d_1f_{-1} \mid f_{-1}d_1), (d_{-1}f_1 \mid f_{-1}d_{-1}), (d_1f_1 \mid f_1d_1),$ $(f_{-1}d_{-1} \mid d_{-1}f_{-1}), (f_1d_{-1} \mid d_1f_{-1}), (f_{-1}d_1 \mid d_{-1}f_1), (f_1d_1 \mid d_1f_1),$ $(f_{-1}f_{-1} \mid d_{-1}d_{-1}), (f_1f_{-1} \mid d_1d_{-1}), (f_{-1}f_1 \mid d_{-1}d_1), (f_1f_1 \mid d_1d_1)$
$9G_1^{\text{fd}} + 16G_3^{\text{fd}} + 100G_5^{\text{fd}}$	$(d_0d_0 \mid f_0f_0), (d_0f_0 \mid f_0d_0), (f_0d_0 \mid d_0f_0), (f_0f_0 \mid d_0d_0)$
$G_1^{\text{fd}} + 24G_3^{\text{fd}} + 15G_5^{\text{fd}}$	$(d_{-2}f_{-1} \mid f_{-1}d_{-2}), (d_2f_1 \mid f_1d_2), (f_{-1}d_{-2} \mid d_{-2}f_{-1}), (f_1d_2 \mid d_2f_1)$
$-G_1^{\text{fd}} - 24G_3^{\text{fd}} - 15G_5^{\text{fd}}$	$(d_2d_{-2} \mid f_1f_{-1}), (d_{-2}d_2 \mid f_{-1}f_1), (f_1f_{-1} \mid d_2d_{-2}), (f_{-1}f_1 \mid d_{-2}d_2)$
$10\sqrt{3}G_3^{\text{fd}} - 35\sqrt{3}G_5^{\text{fd}}$	$(d_1d_{-2} \mid f_{-1}f_0), (d_{-1}d_2 \mid f_1f_0), (d_{-1}f_0 \mid f_1d_{-2}), (d_1f_0 \mid f_{-1}d_2),$ $(d_{-2}d_1 \mid f_0f_{-1}), (d_2d_{-1} \mid f_0f_1), (d_{-2}f_1 \mid f_0d_{-1}), (d_2f_{-1} \mid f_0d_1),$ $(f_0d_{-1} \mid d_{-2}f_1), (f_0d_1 \mid d_2f_{-1}), (f_0f_{-1} \mid d_{-2}d_1), (f_0f_1 \mid d_2d_{-1}),$ $(f_1d_{-2} \mid d_{-1}f_0), (f_{-1}d_2 \mid d_1f_0), (f_{-1}f_0 \mid d_1d_{-2}), (f_1f_0 \mid d_{-1}d_2)$
$-10\sqrt{5}G_3^{\text{fd}} - 7\sqrt{5}G_5^{\text{fd}}$	$(d_{-1}d_{-2} \mid f_{-3}f_0), (d_1d_2 \mid f_3f_0), (d_{-1}f_0 \mid f_{-3}d_2), (d_1f_0 \mid f_3d_{-2}),$ $(d_{-2}d_{-1} \mid f_0f_{-3}), (d_2d_1 \mid f_0f_3), (d_2f_{-3} \mid f_0d_{-1}), (d_{-2}f_3 \mid f_0d_1),$ $(f_0d_{-1} \mid d_2f_{-3}), (f_0d_1 \mid d_2f_3), (f_0f_{-3} \mid d_{-2}d_{-1}), (f_0f_3 \mid d_2d_1),$ $(f_{-3}d_2 \mid d_{-1}f_0), (f_3d_{-2} \mid d_1f_0), (f_{-3}f_0 \mid d_{-1}d_{-2}), (f_3f_0 \mid d_1d_2)$

(continued)

Table A.13 (continued)

$-21\sqrt{15}G_5^{\text{fd}}$	$(d_0d_{-1} \mid f_{-2}f_1), (d_0d_1 \mid f_2f_{-1}), (d_0f_{-1} \mid f_{-2}d_1), (d_0f_1 \mid f_2d_{-1}),$ $(d_{-1}d_0 \mid f_1f_{-2}), (d_1d_0 \mid f_{-1}f_2), (d_1f_{-2} \mid f_{-1}d_0), (d_{-1}f_2 \mid f_1d_0),$ $(f_{-1}d_0 \mid d_1f_{-2}), (f_1d_0 \mid d_{-1}f_2), (f_1f_{-2} \mid d_{-1}d_0), (f_{-1}f_2 \mid d_1d_0),$ $(f_{-2}d_1 \mid d_0f_{-1}), (f_2d_{-1} \mid d_0f_1), (f_{-2}f_1 \mid d_0d_{-1}), (f_2f_{-1} \mid d_0d_1)$
$21\sqrt{5}G_5^{\text{fd}}$	$(d_0d_{-2} \mid f_{-2}f_0), (d_0d_2 \mid f_2f_0), (d_0f_0 \mid f_2d_{-2}), (d_0f_0 \mid f_{-2}d_2),$ $(d_{-2}d_0 \mid f_0f_{-2}), (d_2d_0 \mid f_0f_2), (d_2f_{-2} \mid f_0d_0), (d_{-2}f_2 \mid f_0d_0),$ $(f_0d_0 \mid d_2f_{-2}), (f_0d_0 \mid d_{-2}f_2), (f_0f_{-2} \mid d_{-2}d_0), (f_0f_2 \mid d_2d_0),$ $(f_2d_{-2} \mid d_0f_0), (f_{-2}d_2 \mid d_0f_0), (f_{-2}f_0 \mid d_0d_{-2}), (f_2f_0 \mid d_0d_2)$
$2\sqrt{10}G_1^{\text{fd}} - 2\sqrt{10}G_3^{\text{fd}} - 5\sqrt{10}G_5^{\text{fd}}$	$(d_{-1}d_{-2} \mid f_{-1}f_{-2}), (d_1d_{-2} \mid f_1f_{-2}), (d_{-1}d_2 \mid f_{-1}f_2), (d_1d_2 \mid f_1f_2),$ $(d_{-1}f_{-2} \mid f_{-1}d_{-2}), (d_1f_{-2} \mid f_1d_{-2}), (d_{-1}f_2 \mid f_{-1}d_2), (d_1f_2 \mid f_1d_2),$ $(d_{-2}d_{-1} \mid f_{-2}f_{-1}), (d_2d_{-1} \mid f_2f_{-1}), (d_{-2}d_1 \mid f_{-2}f_1), (d_2d_1 \mid f_2f_1),$ $(d_{-2}f_{-1} \mid f_{-2}d_{-1}), (d_2f_{-1} \mid f_2d_{-1}), (d_{-2}f_1 \mid f_{-2}d_1), (d_2f_1 \mid f_2d_1),$ $(f_{-1}d_{-2} \mid d_{-1}f_{-2}), (f_1d_{-2} \mid d_1f_{-2}), (f_{-1}d_2 \mid d_{-1}f_2), (f_1d_2 \mid d_1f_2),$ $(f_{-1}f_{-2} \mid d_{-1}d_{-2}), (f_1f_{-2} \mid d_1d_{-2}), (f_{-1}f_2 \mid d_{-1}d_2), (f_1f_2 \mid d_1d_2),$ $(f_{-2}d_{-1} \mid d_{-2}f_{-1}), (f_2d_{-1} \mid d_2f_{-1}), (f_{-2}d_1 \mid d_{-2}f_1), (f_2d_1 \mid d_2f_1),$ $(f_{-2}f_{-1} \mid d_{-2}d_{-1}), (f_2f_{-1} \mid d_2d_{-1}), (f_{-2}f_1 \mid d_{-2}d_1), (f_2f_1 \mid d_2d_1)$
$2\sqrt{15}G_1^{\text{fd}} + 3\sqrt{15}G_3^{\text{fd}} - 12\sqrt{15}G_5^{\text{fd}}$	$(d_0f_{-2} \mid f_{-1}d_{-1}), (d_0f_2 \mid f_1d_1), (d_{-1}f_{-1} \mid f_{-2}d_0), (d_1f_1 \mid f_2d_0),$ $(f_{-1}d_{-1} \mid d_0f_{-2}), (f_1d_1 \mid d_0f_2), (f_{-2}d_0 \mid d_{-1}f_{-1}), (f_2d_0 \mid d_1f_1)$
$-2\sqrt{15}G_1^{\text{fd}} - 3\sqrt{15}G_3^{\text{fd}} + 12\sqrt{15}G_5^{\text{fd}}$	$(d_0d_{-1} \mid f_1f_{-2}), (d_0d_1 \mid f_{-1}f_2), (d_{-1}d_0 \mid f_{-2}f_1), (d_1d_0 \mid f_2f_{-1}),$ $(f_1f_{-2} \mid d_0d_{-1}), (f_{-1}f_2 \mid d_0d_1), (f_{-2}f_1 \mid d_{-1}d_0), (f_2f_{-1} \mid d_1d_0)$
$3\sqrt{10}G_1^{\text{fd}} - 3\sqrt{10}G_3^{\text{fd}} + 3\sqrt{10}G_5^{\text{fd}}$	$(d_0f_{-3} \mid f_{-1}d_{-2}), (d_0f_3 \mid f_1d_2), (d_{-2}f_{-1} \mid f_{-3}d_0), (d_2f_1 \mid f_3d_0),$ $(f_{-1}d_{-2} \mid d_0f_{-3}), (f_1d_2 \mid d_0f_3), (f_{-3}d_0 \mid d_{-2}f_{-1}), (f_3d_0 \mid d_2f_1)$
$-3\sqrt{10}G_1^{\text{fd}} + 3\sqrt{10}G_3^{\text{fd}} - 3\sqrt{10}G_5^{\text{fd}}$	$(d_0d_{-2} \mid f_1f_{-3}), (d_0d_2 \mid f_{-1}f_3), (d_{-2}d_0 \mid f_{-3}f_1), (d_2d_0 \mid f_3f_{-1}),$ $(f_1f_{-3} \mid d_0d_{-2}), (f_{-1}f_3 \mid d_0d_2), (f_{-3}f_1 \mid d_{-2}d_0), (f_3f_{-1} \mid d_2d_0)$
$3\sqrt{2}G_1^{\text{fd}} - 3\sqrt{2}G_3^{\text{fd}} - 60\sqrt{2}G_5^{\text{fd}}$	$(d_0f_0 \mid f_1d_{-1}), (d_0f_0 \mid f_{-1}d_1), (d_1f_{-1} \mid f_0d_0), (d_{-1}f_1 \mid f_0d_0),$ $(f_0d_0 \mid d_1f_{-1}), (f_0d_0 \mid d_{-1}f_1), (f_1d_{-1} \mid d_0f_0), (f_{-1}d_1 \mid d_0f_0)$
$-3\sqrt{2}G_1^{\text{fd}} + 3\sqrt{2}G_3^{\text{fd}} + 60\sqrt{2}G_5^{\text{fd}}$	$(d_0d_{-1} \mid f_{-1}f_0), (d_0d_1 \mid f_1f_0), (d_{-1}d_0 \mid f_0f_{-1}), (d_1d_0 \mid f_0f_1),$ $(f_0f_{-1} \mid d_{-1}d_0), (f_0f_1 \mid d_1d_0), (f_{-1}f_0 \mid d_0d_{-1}), (f_1f_0 \mid d_0d_1)$
$3\sqrt{5}G_1^{\text{fd}} + 2\sqrt{5}G_3^{\text{fd}} - 4\sqrt{5}G_5^{\text{fd}}$	$(d_1f_{-3} \mid f_0d_{-2}), (d_{-1}f_3 \mid f_0d_2), (d_{-2}f_0 \mid f_{-3}d_1), (d_2f_0 \mid f_3d_{-1}),$ $(f_0d_{-2} \mid d_1f_{-3}), (f_0d_2 \mid d_{-1}f_3), (f_{-3}d_1 \mid d_{-2}f_0), (f_3d_{-1} \mid d_2f_0)$
$-3\sqrt{5}G_1^{\text{fd}} - 2\sqrt{5}G_3^{\text{fd}} + 4\sqrt{5}G_5^{\text{fd}}$	$(d_{-1}d_{-2} \mid f_0f_{-3}), (d_1d_2 \mid f_0f_3), (d_{-2}d_{-1} \mid f_{-3}f_0), (d_2d_1 \mid f_3f_0),$ $(f_0f_{-3} \mid d_{-1}d_{-2}), (f_0f_3 \mid d_1d_2), (f_{-3}f_0 \mid d_{-2}d_{-1}), (f_3f_0 \mid d_2d_1)$
$3\sqrt{5}G_1^{\text{fd}} - 8\sqrt{5}G_3^{\text{fd}} + 10\sqrt{5}G_5^{\text{fd}}$	$(d_0d_{-2} \mid f_0f_{-2}), (d_0d_2 \mid f_0f_2), (d_0f_{-2} \mid f_0d_{-2}), (d_0f_2 \mid f_0d_2),$ $(d_{-2}d_0 \mid f_{-2}f_0), (d_2d_0 \mid f_2f_0), (d_{-2}f_0 \mid f_{-2}d_0), (d_2f_0 \mid f_2d_0),$ $(f_0d_{-2} \mid d_0f_{-2}), (f_0d_2 \mid d_0f_2), (f_0f_{-2} \mid d_0d_{-2}), (f_0f_2 \mid d_0d_2),$ $(f_{-2}d_0 \mid d_{-2}f_0), (f_2d_0 \mid d_2f_0), (f_{-2}f_0 \mid d_{-2}d_0), (f_2f_0 \mid d_2d_0)$
$-42\sqrt{6}G_5^{\text{fd}}$	$(d_1d_{-2} \mid f_{-3}f_2), (d_{-1}d_2 \mid f_3f_{-2}), (d_1f_{-2} \mid f_{-3}d_2), (d_{-1}f_2 \mid f_3d_{-2}),$ $(d_2d_{-1} \mid f_{-2}f_3), (d_{-2}d_1 \mid f_2f_{-3}), (d_2f_{-3} \mid f_{-2}d_1), (d_{-2}f_3 \mid f_2d_{-1}),$ $(f_2d_{-1} \mid d_{-2}f_3), (f_{-2}d_1 \mid d_2f_{-3}), (f_2f_{-3} \mid d_{-2}d_1), (f_{-2}f_3 \mid d_2d_{-1}),$ $(f_3d_{-2} \mid d_{-1}f_2), (f_{-3}d_2 \mid d_1f_{-2}), (f_3f_{-2} \mid d_{-1}d_2), (f_{-3}f_2 \mid d_1d_{-2})$
$5\sqrt{10}G_3^{\text{fd}} + 14\sqrt{10}G_5^{\text{fd}}$	$(d_0f_{-1} \mid f_{-3}d_2), (d_0f_1 \mid f_3d_{-2}), (d_2f_{-3} \mid f_{-1}d_0), (d_{-2}f_3 \mid f_1d_0),$ $(f_{-1}d_0 \mid d_2f_{-3}), (f_1d_0 \mid d_{-2}f_3), (f_{-3}d_2 \mid d_0f_{-1}), (f_3d_{-2} \mid d_0f_1)$
$-5\sqrt{10}G_3^{\text{fd}} - 14\sqrt{10}G_5^{\text{fd}}$	$(d_0d_{-2} \mid f_{-3}f_1), (d_0d_2 \mid f_3f_{-1}), (d_{-2}d_0 \mid f_1f_{-3}), (d_2d_0 \mid f_{-1}f_3),$ $(f_1f_{-3} \mid d_{-2}d_0), (f_{-1}f_3 \mid d_2d_0), (f_{-3}f_1 \mid d_0d_{-2}), (f_3f_{-1} \mid d_0d_2)$

(continued)

Table A.13 (continued)

$5\sqrt{10}G_3^{\text{fd}} - 28\sqrt{10}G_5^{\text{fd}}$	$(d_1f_{-1} \mid f_{-2}d_2), (d_{-1}f_1 \mid f_2d_{-2}), (d_2f_{-2} \mid f_{-1}d_1), (d_{-2}f_2 \mid f_1d_{-1}),$ $(f_1d_{-1} \mid d_{-2}f_2), (f_{-1}d_1 \mid d_2f_{-2}), (f_2d_{-2} \mid d_{-1}f_1), (f_{-2}d_2 \mid d_1f_{-1})$
$-5\sqrt{10}G_3^{\text{fd}} + 28\sqrt{10}G_5^{\text{fd}}$	$(d_1d_{-2} \mid f_{-2}f_1), (d_{-1}d_2 \mid f_2f_{-1}), (d_2d_{-1} \mid f_{-1}f_2), (d_{-2}d_1 \mid f_1f_{-2}),$ $(f_1f_{-2} \mid d_{-2}d_1), (f_{-1}f_2 \mid d_2d_{-1}), (f_2f_{-1} \mid d_{-1}d_2), (f_{-2}f_1 \mid d_1d_{-2})$
$-5\sqrt{15}G_3^{\text{fd}} + 7\sqrt{15}G_5^{\text{fd}}$	$(d_{-1}d_{-1} \mid f_1f_{-3}), (d_1d_1 \mid f_{-1}f_3), (d_{-1}d_{-1} \mid f_{-3}f_1), (d_1d_1 \mid f_3f_{-1}),$ $(d_{-1}f_{-1} \mid f_{-3}d_1), (d_1f_1 \mid f_3d_{-1}), (d_1f_{-3} \mid f_{-1}d_{-1}), (d_{-1}f_3 \mid f_1d_1),$ $(f_{-1}d_{-1} \mid d_1f_{-3}), (f_1d_1 \mid d_{-1}f_3), (f_1f_{-3} \mid d_{-1}d_{-1}), (f_{-1}f_3 \mid d_1d_1),$ $(f_{-3}d_1 \mid d_{-1}f_{-1}), (f_3d_{-1} \mid d_1f_1), (f_{-3}f_1 \mid d_{-1}d_{-1}), (f_3f_{-1} \mid d_1d_1)$
$5\sqrt{6}G_1^{\text{fd}} - 5\sqrt{6}G_3^{\text{fd}} - 2\sqrt{6}G_5^{\text{fd}}$	$(d_{-1}f_{-3} \mid f_{-2}d_{-2}), (d_1f_3 \mid f_2d_2), (d_{-2}f_{-2} \mid f_{-3}d_{-1}), (d_2f_2 \mid f_3d_1),$ $(f_{-2}d_{-2} \mid d_{-1}f_{-3}), (f_2d_2 \mid d_1f_3), (f_{-3}d_{-1} \mid d_{-2}f_{-2}), (f_3d_1 \mid d_2f_2)$
$-5\sqrt{6}G_1^{\text{fd}} + 5\sqrt{6}G_3^{\text{fd}} + 2\sqrt{6}G_5^{\text{fd}}$	$(d_1d_{-2} \mid f_2f_{-3}), (d_{-1}d_2 \mid f_{-2}f_3), (d_2d_{-1} \mid f_3f_{-2}), (d_{-2}d_1 \mid f_3f_2),$ $(f_2f_{-3} \mid d_1d_{-2}), (f_{-2}f_3 \mid d_{-1}d_2), (f_3f_{-2} \mid d_2d_{-1}), (f_{-3}f_2 \mid d_{-2}d_1)$
$6\sqrt{2}G_1^{\text{fd}} + 4\sqrt{2}G_3^{\text{fd}} - 50\sqrt{2}G_5^{\text{fd}}$	$(d_0d_{-1} \mid f_0f_{-1}), (d_0d_1 \mid f_0f_1), (d_0f_{-1} \mid f_0d_{-1}), (d_0f_1 \mid f_0d_1),$ $(d_{-1}d_0 \mid f_{-1}f_0), (d_1d_0 \mid f_1f_0), (d_{-1}f_0 \mid f_{-1}d_0), (d_1f_0 \mid f_1d_0),$ $(f_0d_{-1} \mid d_0f_{-1}), (f_0d_1 \mid d_0f_1), (f_0f_{-1} \mid d_0d_{-1}), (f_0f_1 \mid d_0d_1),$ $(f_{-1}d_0 \mid d_{-1}f_0), (f_1d_0 \mid d_1f_0), (f_{-1}f_0 \mid d_{-1}d_0), (f_1f_0 \mid d_1d_0)$
$\sqrt{10}G_1^{\text{fd}} - 6\sqrt{10}G_3^{\text{fd}} - 6\sqrt{10}G_5^{\text{fd}}$	$(d_1f_{-1} \mid f_2d_{-2}), (d_{-1}f_1 \mid f_{-2}d_2), (d_2f_{-2} \mid f_1d_{-1}), (d_{-2}f_2 \mid f_{-1}d_1),$ $(f_1d_{-1} \mid d_2f_{-2}), (f_{-1}d_1 \mid d_{-2}f_2), (f_2d_{-2} \mid d_1f_{-1}), (f_{-2}d_2 \mid d_{-1}f_1)$
$-\sqrt{10}G_1^{\text{fd}} + 6\sqrt{10}G_3^{\text{fd}} + 6\sqrt{10}G_5^{\text{fd}}$	$(d_{-1}d_{-2} \mid f_{-2}f_{-1}), (d_1d_2 \mid f_2f_1), (d_{-2}d_{-1} \mid f_{-1}f_{-2}), (d_2d_1 \mid f_1f_2),$ $(f_{-1}f_{-2} \mid d_{-2}d_{-1}), (f_1f_2 \mid d_2d_1), (f_{-2}f_{-1} \mid d_{-1}d_{-2}), (f_2f_1 \mid d_1d_2)$
$\sqrt{15}G_1^{\text{fd}} + 4\sqrt{15}G_3^{\text{fd}} + \sqrt{15}G_5^{\text{fd}}$	$(d_2f_{-1} \mid f_3d_{-2}), (d_{-2}f_1 \mid f_{-3}d_2), (d_2f_{-3} \mid f_1d_{-2}), (d_{-2}f_3 \mid f_{-1}d_2),$ $(f_1d_{-2} \mid d_2f_{-3}), (f_{-1}d_2 \mid d_{-2}f_3), (f_3d_{-2} \mid d_2f_{-1}), (f_{-3}d_2 \mid d_{-2}f_1)$
$-\sqrt{15}G_1^{\text{fd}} - 4\sqrt{15}G_3^{\text{fd}} - \sqrt{15}G_5^{\text{fd}}$	$(d_{-2}d_{-2} \mid f_{-1}f_{-3}), (d_2d_2 \mid f_1f_3), (d_{-2}d_{-2} \mid f_{-3}f_{-1}), (d_2d_2 \mid f_3f_1),$ $(f_{-1}f_{-3} \mid d_{-2}d_{-2}), (f_1f_3 \mid d_2d_2), (f_{-3}f_{-1} \mid d_{-2}d_{-2}), (f_3f_1 \mid d_2d_2)$
$\sqrt{3}G_1^{\text{fd}} + 4\sqrt{3}G_3^{\text{fd}} - 20\sqrt{3}G_5^{\text{fd}}$	$(d_{-1}f_{-1} \mid f_0d_{-2}), (d_1f_1 \mid f_0d_2), (d_{-2}f_0 \mid f_{-1}d_{-1}), (d_2f_0 \mid f_1d_1),$ $(f_0d_{-2} \mid d_{-1}f_{-1}), (f_0d_2 \mid d_1f_1), (f_{-1}d_{-1} \mid d_{-2}f_0), (f_1d_1 \mid d_2f_0)$
$-\sqrt{3}G_1^{\text{fd}} - 4\sqrt{3}G_3^{\text{fd}} + 20\sqrt{3}G_5^{\text{fd}}$	$(d_1d_{-2} \mid f_0f_{-1}), (d_{-1}d_2 \mid f_0f_1), (d_{-2}d_{-1} \mid f_{-1}f_0), (d_2d_{-1} \mid f_1f_0),$ $(f_0f_{-1} \mid d_1d_{-2}), (f_0f_1 \mid d_{-1}d_2), (f_{-1}f_0 \mid d_{-2}d_{-1}), (f_1f_0 \mid d_2d_{-1})$
$\sqrt{30}G_1^{\text{fd}} - \sqrt{30}G_3^{\text{fd}} + 8\sqrt{30}G_5^{\text{fd}}$	$(d_{-1}f_0 \mid f_{-2}d_1), (d_1f_0 \mid f_2d_{-1}), (d_1f_{-2} \mid f_0d_{-1}), (d_{-1}f_2 \mid f_0d_1),$ $(f_0d_{-1} \mid d_1f_{-2}), (f_0d_1 \mid d_{-1}f_2), (f_{-2}d_1 \mid d_{-1}f_0), (f_2d_{-1} \mid d_1f_0)$
$-\sqrt{30}G_1^{\text{fd}} + \sqrt{30}G_3^{\text{fd}} - 8\sqrt{30}G_5^{\text{fd}}$	$(d_{-1}d_{-1} \mid f_0f_{-2}), (d_1d_1 \mid f_0f_2), (d_{-1}d_{-1} \mid f_{-2}f_0), (d_1d_1 \mid f_2f_0),$ $(f_0f_{-2} \mid d_{-1}d_{-1}), (f_0f_2 \mid d_1d_1), (f_{-2}f_0 \mid d_{-1}d_{-1}), (f_2f_0 \mid d_1d_1)$
$\sqrt{6}G_1^{\text{fd}} - 6\sqrt{6}G_3^{\text{fd}} + 15\sqrt{6}G_5^{\text{fd}}$	$(d_0f_{-1} \mid f_1d_{-2}), (d_0f_1 \mid f_{-1}d_2), (d_{-2}f_1 \mid f_{-1}d_0), (d_2f_{-1} \mid f_1d_0),$ $(f_{-1}d_0 \mid d_{-2}f_1), (f_1d_0 \mid d_2f_{-1}), (f_1d_{-2} \mid d_0f_{-1}), (f_{-1}d_2 \mid d_0f_1)$
$-\sqrt{6}G_1^{\text{fd}} + 6\sqrt{6}G_3^{\text{fd}} - 15\sqrt{6}G_5^{\text{fd}}$	$(d_0d_{-2} \mid f_{-1}f_{-1}), (d_0d_2 \mid f_1f_1), (d_{-2}d_0 \mid f_{-1}f_{-1}), (d_2d_0 \mid f_1f_1),$ $(f_{-1}f_{-1} \mid d_0d_{-2}), (f_1f_1 \mid d_0d_2), (f_{-1}f_{-1} \mid d_{-2}d_0), (f_1f_1 \mid d_2d_0)$

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