

CORRECTIONS TO J-P. SERRE'S BOOKS

Abelian ℓ -adic Representations and Elliptic Curves (second edition, AK Peters, 1988)

- p.I-26, line 3. Replace $L_m(s - m/2)$ by $L_m(s + m/2)$.
- p.III-10, line 3. Replace chap. II, 1.1 by chap.II, 2.1 .
- p.III-10. The Proposition should be labelled Proposition 1.
- p.III-13, line 3. Replace chap.II, 2.2 by chap.II, 2.3 .
- p.III-15, line 3. Replace 2.4 by 2.5 .
- p.III-15, line -5,6. Replace proposition by theorem .
- p.III-15, line -1. Replace Remark 1 by Remark 2 .
- p.III-29, line 3. Replace Here $K^* = (K \otimes R)^*$ by Here $K_\infty^* = (K \otimes R)^*$.
- p.III-39, line 1. Replace Proposition 3 by Proposition 4 .
- p.III-39, line 6. Replace A1 by A2.
- p.III-41, line -5. Replace Proposition 4 by Proposition 5 .
- p.III-48, line 3. Replace Proposition 5 by Proposition 6 .
- p.III-49, line -3. Replace Proposition 6 by Proposition 7 .
- p.III-50, lines 10-11. Replace Prop.5 by Prop.6 and replace Prop.6 by Prop.7 .
- p.III-52, line 2 of th.3. Replace G^{al} by G^{ab}
- p.III-53, line -1. Replace Prop.6 by Prop.7 .
- p.IV-8, line 5. Replace $u^{12}\Delta'$ by $u_v^{12}\Delta'$.
- p.IV-17, line -11. Replace section 4 by section 2.2 .
- p.IV-19, part (c) of Main Lemma. Replace G_ℓ by \tilde{G}_ℓ .
- p.B-7. Reference [80]. Add (=Oe.136) .

Algebraic Groups and Class Fields (Springer-Verlag, 1988)

- Contents, Chapter VI , §34. Replace Map by Application .
- p.17, line -2. Replace ample by very ample .
- p.18, line -8. Replace varietities by varieties.
- p.36, line 4. Replace $N_Q f$ by Nf .
- p.36, line 6. After with g , add ; here Nf means $N_{L/K}f$.

- p.36, line -9. In the displayed formula, replace $>$ by $<$.
- p.108, line -2. Replace Châtalet by Châtelet.
- p.117. The title of §2.7 of Chap.VI should be Review of definitions about coverings .
- p.122, Proposition 11. Replace an isogeny by a separable isogeny.
- p.124, Corollary. Replace isogenies by separable isogenies.
- p.154, line 9. Replace non-published by unpublished.
- p.157. The title of §34 should be Application to the cycle class group .
- p.158, line 5. Replace Frobeniuis by Frobenius.
- p.199, [27]. Replace Tohoku by Tôhoku .
- p.202, [86]. Replace *finis* by *fini*.
- p.202, [90]. Replace algébre by algèbre.

Local Fields (Springer-Verlag, third printing, 1979)

[The corrections from p.110 to p.216 have been communicated to me by R. Gualdi.]

- p.14, line 18. Replace $\mathfrak{p}B = \prod_{\mathfrak{p}|\mathfrak{p}} \mathfrak{P}^{e_{\mathfrak{p}}}$ by $\mathfrak{p}B = \prod_{\mathfrak{p}|\mathfrak{p}} \mathfrak{P}^{e_{\mathfrak{p}}}$.
- p.15, last line. Replace $N : I_A \rightarrow I_B$ by $N : I_B \rightarrow I_A$.
- p.31, line 3. Replace K by \hat{K} .
- p.63, last line of prop.3. Replace $e_{L/K}$ by $e_{L/K'}$.
- p.63, fifth line of proof of prop.3. Replace st by st .
- p.74, line -7. Replace twice ϕ by φ .
- p.75, Lemma 5. Replace ϕ by φ .
- p.110, line 7. Replace $A \otimes X$ by $\Lambda \otimes X$.
- p.113, line 1. Replace $f(g_0, \dots, g_i)$ by $f(g_1, \dots, g_i)$.
- p.174, line 6 of the proof of prop.5. Replace $b' \in A_F$ by $b' \in A_{F'}$.
- p.182, line 4 of §2. The reference to §12 Bourbaki Alg.VIII is relative to the first edition. In the 2012 edition, this § is now §17.
- p.182, line -5. Replace ω by w .
- p.183, line 3. Replace K^n by K^{n^2} .
- p.183, line 8. Replace result by results.
- p.185, line 4. Add the letter v on top of the arrow $L^* \rightarrow \mathbf{Z}$.
- p.186, line 4 after the Corollary. Replace Brauer group B_K of \bar{K} by Brauer group $B_{\bar{K}}$ of \bar{K} .
- p.191, prop. 4 (a). Replace $w \in K_s^*$ by $w \in k_s^*$.
- p.193, line 7. The arrow from $H^2(\mathfrak{g}, \mathbf{Z})$ to $H^1(\mathfrak{g}, \mathbf{Q}/\mathbf{Z})$ should go in the other direction.

p.206, line 5. The arrow $\varphi_a : G \rightarrow \mathbf{Z}/\mathbf{Z}$ should be defined first as a map of G into the group μ_n of the n -th roots of unity, and then as a map into $\mathbf{Z}/n\mathbf{Z}$ by choosing a generator of μ_n in order to identify $\mathbf{Z}/n\mathbf{Z}$ and μ_n .

p.206, prop.4 (iv). One should assume $a \neq 1$.

p.211, line -1. Replace α'^β by a'^β .

p.216, prop.14. Formula (ii) should be $[a, bb']_v = [a, b]_v + [a, b']_v$.

p.216, prop.14 (v). Add *If* before $[a, b]_v = 0$.

Galois Cohomology (Springer-Verlag, corrected second printing 2002)

p.vii. The title of §1.5 should be Free pro- p -groups.

p.7, line -5. Same correction as above.

p.15, line 14. Replace $M' \in C_K$ by $M' \in C'_K$.

p.36, line 15. Replace idèle classes by ideal classes.

p.49, line 7. Replace (A', A'') -principal by (A, A'') -principal.

p.129, line -1. Replace prop.36 by prop.37.

p.134, last line of exerc.3. Replace if the field k is (C_1) ” by if the field k has the following property :

(C'_1) Every finite family f_1, \dots, f_m of homogeneous polynomials in $k[x_1, \dots, x_n]$, of degrees d_1, \dots, d_m with $\sum d_i < n$, has a non trivial zero in k^n .”

Note that (C'_1) implies (C_1) . Whether the converse is true seems to be an open question.

p.194, line 20. Replace a SDNB by an SDNB .

Lie Algebras and Lie Groups (Springer-Verlag, LN 1500, corrected fifth printing, 2006)

p.23, line 16. Replace $H^2 = \{x, y\}$ by $H^2 = \{xy\}$.

p.120, exerc. 2 b). In the denominator of the formula, $(i + j - k)$ should be $(i + j - k)!$.

Complex Semisimple Lie Algebras (Springer-Verlag, 1987)

p.4, line -1. Replace This implication by The implication.

p.13, Lemma 1. Replace nilpotent by invertible.

p.22, line -15. Add a closed parenthesis) after algebra”.

p.32, line 8. Replace $\beta \in S$ by $\alpha \in S$.

p.32, line -9. Replace for all $\alpha \in s$ by for all $\alpha \in S$.

p.49, line 19. Replace shows by means.

p.52, line -6. Add a reference to Chevalley's note "Sur la classification des algèbres de Lie simples et de leur représentations" (CRAS 227 (1948), 1136-1138), where the relations $(\theta_{ij}), (\theta_{ij}^-)$ are defined, and are used to prove results analogous to those given in the text (but somewhat weaker). Similar results were obtained slightly later by Harish-Chandra in his paper "On some applications of the universal enveloping algebra of a semisimple Lie algebra", TAMS 70 (1951), 28-96. These θ -relations should thus be called "Chevalley relations" or "Chevalley-Harish-Chandra relations" - but not "Serre relations", as some people do.

- p.54, line -1. Replace \mathfrak{g} by \mathfrak{g}^α .
- p.61, line 10. Replace E'_1 by E'_i .
- p.68, line 9. Replace \mathfrak{g} by \mathfrak{g} .
- p.68, line 17. Replace $\gamma \in P$ by $\gamma \in P_1$.

Local Algebra (Springer-Verlag, 2000)

p.9. Rewrite the Corollary to Proposition 8 as follows :
Let $\mathfrak{p} \in \text{Spec}(A)$. Suppose $M \neq 0$. The following are equivalent :

- (1) $\text{Ass } M = \{\mathfrak{p}\}$.
 - (2) x_M is nilpotent for every $x \in \mathfrak{p}$ and is injective for every $x \notin \mathfrak{p}$.
- p.92, line 3. Replace M if by M is.

A Course in Arithmetic (Springer-Verlag, corrected third printing, 1996)

- p.83, line -13. Replace this line by : $\geq m^2 - |mn| + n^2 = |m\rho \pm n|^2$.
- p.91, Proposition 7. Add (Euler) after Proposition 7.
- p.112, lines 7,8. Replace by : "G. Lejeune-Dirichlet - Beweis eines Satzes über die arithmetische Progression, 1837, *Werke* I, 307-312.

Trees (Springer-Verlag, corrected second printing, 2003)

p.19, line 6 (without counting the picture). The sentence " The subtree generated by a set of vertices " should be in italics (it is a subtitle).

- p.63, line 7. Replace $m + 2s$ by $m + 2d$.
- p.65, line -2. Replace prop.26 by prop.25.
- p.68, line 12. The reference to Tits Comptes rendus note should be : "Systèmes générateurs de groupes de congruence", CRAS 283 (1976), 693-695 = Collected Works vol.III, [100].
- p.84, line 5. Replace (twice) L_V by L_v .
- p.89, line -14. Replace $\mu = (G/\Gamma^0)$ by $\mu(G/\Gamma^0)$.

p.112, line -10. Replace *apartment* by *sector*.

Lectures on the Mordell-Weil theorem (Vieweg, third edition, 1997)

p.67, exercise. Remove item e).

p.148, line 5. Remove the word “normal” in “closed normal subgroup H ”.

p.149, line 19. Replace “corresonding” by “corresponding”.

p.151, line 5. Replace “weakend” by “weakened”.

p.162, Questions 1) and 2). An elliptic curve over \mathbf{Q} of rank ≥ 28 has been constructed by N. Elkies in 2006. Over $\mathbf{Q}(\mathbf{T})$ (with non constant j invariant), the record is ≥ 18 , and it is also due to Elkies. See e.g. Elkies paper arXiv : 0709.2908.

p.162, line 12. No cap. in “variation”.

p.192, Table of the 13 values of j ... In the case $d = -3, f = 3$, the value of j is $2^{15}3.5^3$, and not $-2^{15}3.5^3$.

p.205, reference [12]. Replace “groupes” by “groupe”.

p.207, reference [Se1]. Replace “Quelque” by “Quelques”.

p.207, reference [Se2]. Replace “groups” by “groupes”.

Collected Works I (Springer Verlag, second printing, 2003)

p.vii. Add to the list of Academies : Russia (2003), Norway (2009), Taiwan (2010), Torino (2010).

Add to the list of doctorates : Oslo (2002), Oxford (2003), Bucharest (2004), Barcelona (2004), Madrid (2006), McGill (2008), TsingHua (2017).

In “Cours dans des universités étrangères”, add the year 2007 to the Harvard list, and also : E.P.F.L. Lausanne (2011), Hsinchu (2009, 2011, 2013), Pohang (2011).

p.xix. The list of “textes non reproduits dans les Oeuvres” should be enlarged, by mentioning the following books :

“Exposés de Séminaires (1950-1999)”, S.M.F. Doc. Math. 1, 2008 ;

(with P. Colmez) “Grothendieck-Serre Correspondence” (bilingual edition), S.M.F. Doc. Math. 2 and A.M.S., 2004 ;

“Lectures on $N_X(p)$ ”, C.R.C. Press, 2012 ;

(with P. Colmez) “Correspondance Serre-Tate” , S.M.F. Doc. Math. 13-14, 2015 ;

“Finite Groups : An Introduction”, International Press, 2016 ;

(with E. Howe, J. Oesterlé and C. Ritzenthaler) “Rational Points on Curves over Finite Fields”, S.M.F. Doc. Math. 18, 2020.

It should also mention the following papers :

“Cohomological invariants, Witt invariants and trace forms” (notes by Sip Garibaldi), ULS 28, A.M.MS. 2003, 1-100 ;

L’histoire de la “modularity conjecture”, SMF Gazette 91 (2002), 55-57.
(with M. Rost and J-P. Tignol) La forme trace d’une algèbre simple centrale de degré 4, CRAS 342 (2006), 83-87.

(with V. Chernousov) Estimating essential dimensions via orthogonal representations, J. Algebra 305 (2006), 1055-1070

Bounds for the orders of the finite subgroups of $G(k)$, in *Group Representation Theory* (M. Geck, D. Testerman & J Thévenaz, edit.), EPFL Press, 2007, 405-450.

Three letters to Walter Feit on group representations and quaternions, J. Algebra 319 (2008), 549-557.

How to use finite fields for problems concerning infinite fields, Contemp. Math. 487, AMS (2009), 183-193.

La vie et l’oeuvre scientifique d’Henri Cartan, Gazette des mathématiciens 121 (2009), 65-70.

A Minkowski-style bound for the order of the finite subgroups of the Cremona group of rank 2 over an arbitrary field, Moscow math. J. 9 (2009), 183-198.

(with J-L. Nicolas) Formes modulaires modulo 2, CRAS 350 (2012), 343-348 and 449-454.

(with E. Bayer-Fluckiger & R. Parimala) Hasse principle for G -trace forms, Izv. Math. 77 (2013), 5-28.

Un critère d’indépendance pour une famille de représentations ℓ -adiques, Comment. Math. Helv. 88 (2013), 541-554.

Bases normales autoduales et groupes unitaires en caractéristique 2, Transf. Groups 19 (2014), 643-698.

On the mod p reduction of orthogonal representations, in *Lie Groups, Geometry, and Representation Theory - a tribute to the life and work of Bertram Kostant* (V.G. Kac & V.L. Popov edit.), Birkhäuser (2018), 527-540.

La vie et l’oeuvre de Jean-Marc Fontaine, Comptes Rendus Mathématique 358 (2020), 1045-1046.

La vie et l’oeuvre de John Tate, Comptes Rendus Mathématique 358 (2020), 1129-1133.

(with E. Bayer-Fluckiger) Lines on cubic surfaces, Witt invariants and

Stiefel-Whitney classes, *Indag. Math.* 32 (2021), 920-938.

p.xxii. Add to the list of the Bourbaki seminars :

Complète Réductibilité, 2003/2004, n°**932**, 23 p.

Le groupe de Cremona et ses sous-groupes finis, 2008/2009, n°**1000**, 26 p.

Distribution asymptotique des valeurs propres des endomorphismes de Frobenius [d'après Abel, Chebyshev, Robinson,...], 2017/2018, n°**1146**, 43 p.

p.xxiii. Add a subsection named *Oberwolfach Reports* :

On the values of the characters of compact Lie groups, 2004, 666-667.

BL-bases and unitary groups in characteristic 2, 2005, 37-40.

Coordonnées de Kac, 2006, 1787-1790.

Le groupe quaquaversal, vu comme groupe S-arithmétique, 2009, 1421-1422.

Some aspects of the Sato-Tate conjecture, 2011, 1996-1997.

Cohomological invariants mod 2 of Weyl groups, 2018, 1284-1286.

p.594, lines 8-9. “on ignore si V est toujours simplement connexe”. This has been settled (positively) by J. Kollár, cf. Bourbaki seminar 905 (June 2002), cor. 3.6.

Collected Works II (Springer Verlag, second printing, 2003)

p.3, line 6. Add “compactes ” before “connexes ” .

p.467, line 14. Add an arrow \rightarrow in the formula. It should be $\varphi_2 : \Gamma_q(2) \rightarrow C$.

p.508, line -6. Replace X^n by x^n .

p.714, line 5. Replace 1964 by 1974 in the reference to Deligne’s paper.

Collected Works III (Springer Verlag, second printing, 2003)

p.265, line -13. Replace asymptotique by asymptotique.

p.449, line 2. In formula (6), replace \sum by \prod .

p.538, footnote. It seems that Brylinski’s proof needs some repair ; see J-L. Colliot-Thélène, *Expo. Math.* 23 (2005), 161-170.

Collected Works IV (Springer Verlag, second printing, 2003)

p.358, line -4. Replace facon by façon.

p.378, line -16. Replace de G by de H .

p.389, line 8. Replace symétriqu by symétrique.

p.389, line -9. Delete the middle parenthesis in $(\mathbf{F})_2)^r$.

p.400, line -13. Replace certaine by certains.

p.406, line -4. Replace 8.5.4 by 6.5.4.

- p.414, line 8. Replace $x, y \in V$ by $x \in P, y \in V$.
- p.446, line -7. Replace K_x by F_x .
- p.527. About the canonical structures of the supersingular elliptic curves, see the comments given in *Correspondance Serre-Tate*, vol.II, p.727.
- p.566, formula (104). Replace T by T' .
- p.568, line 2. Replace formule (13) by prop.4.
- p.676, line 14. Replace Il reste à traiter le cas 2-adique by :
Le cas $p = 2$ a été traité onze ans plus tard par les mêmes auteurs : *Ann. Math.* **172** (2010), 1391-1405.

Linear Representations of Finite Groups (Springer-Verlag, corrected third printing, 1986)

- p.11, line 10. Add a period after class function.
- P.15, line 6. Replace χ by ψ .
- p.33, line -18. Delete the letter s at the end of representations.
- p.43. Exercises 5.4 and 5.5 should be labelled 5.5 and 5.6.
- p.50, last line of prop.12. Replace $\tilde{\rho}(u)$ by $\tilde{\rho}_i(u)$.
- p.63, line 18. Replace $W = \bigoplus_{\chi \in X} W$ by $W = \bigoplus_{\chi \in X} W_\chi$.
- p.76, line -1. Delete the extra parenthesis) after the first term.
- p.86, line -1. In the formula $P_{M, c_2} = P_{M, c_2}$, replace the first c_2 by c_1 .
- p.105, line 11. Replace reresentation by representation.
- p.106, line -7. Replace C by \mathbf{C} .
- p.110, line 4. Delete the parentheses around $\text{Cent}.R[G]$.
- p.110, line -3. Replace ex.12.9 by ex.13.9.
- p.125, line 11. Replace 15.1 by 15.2.
- p.125, line -5. Replace By (a) by By the first case.
- p.132, line 11. Replace $R_A(G)$ by $P_A(G)$ and replace $R_k(G)$ by $P_k(G)$.
- p.134, line 10. Replace $P_K^+(G)$ by $P_k^+(G)$.
- p.136, part (c) of Proposition 46. Replace $A[G]$ by $k[G]$.
- p.142, line -11. In the bottom line of the diagram, replace $P_k(G)$ by $R_k(G)$.
- p.143, line 13. Replace $R_{k'}(G)$ by $R_{K'}(G)$.
- p.143, line -9. Replace r_p by r_P .
- p.145, line -8. Add a parenthesis) after $b \in F$; delete the parenthesis) after of E .
- p.149, line 9. Replace $R_G(G)$ by $R_K(G)$.
- p.159, line -8. Replace ν_F by a_G .

- p.162, line -7. In the formula, replace $i \geq \ell$ by $i \geq 1$.
- p.163, line -1. Permute E and E' .
- p.164, line -10. The letter Z should be in boldface : **Z**.
- p.168, line 8. Replace $F_{C(G):9.1}$ by $F_{C(G)} : 9.1$.

Exposés de Séminaires 1950-1999 (deuxième édition, augmentée, SMF, 2008)

- p.136, line -6. Replace “ne s’étend par” by “ne s’étend pas”.
- p.146, line -8. Replace “mas” by “mais”.
- p.253, line 10. Replace “fixed point of G ” by “fixed point of g ” .

Cohomological invariants, Witt invariants, and trace forms (p.1-100 of AMS ULS28, 2004)

- p.46, line -8. Replace “Choose α ” by “Choose $\alpha \neq 0$ ”.
- p.60, Lemma 25.12. Replace $n \equiv i \pmod{2}$ by $n \not\equiv i \pmod{2}$, and vice-versa.
- p.70, line 7. Replace “Th.27.14” by “Th.27.15”.
- p.78, line -15. Add “with $A, B, A^2 - B \neq 0$ ” after “ $\langle A, A^2 - B, (AB(A^2 - B)) \rangle$ ”.

Grothendieck-Serre Correspondence (Bilingual edition, SMF-AMS, 2004)

- p.137. In conditions C_n and C'_n , replace “ i ” by “ q ”.
- p.168, line -10, French side. Replace “où il est ” by “où 11 est ”.
- p.239. Replace the date of the letter by “1.15.1964” (this mistake was pointed out by R. Steinberg).
- p.288, English side. Replace the first two lines by : “Representations over **Z**, 235-238”.

Lectures on $N_X(p)$ (CRC Press, 2012)

[Many of these corrections were communicated to me by Francesc Fité.]

- p.16, line 13. Replace Σ_K by V_K .
- p.18, line 15. Replace Exerc.2 by Exerc.1.
- p.19, line -3. In the second term of the formula, add the letter m in front of t^{m-1} , as in the first term.
- p.21, line 14. Replace When is the by In that .
- p.25, line 1. Replace §3.3.3.3 by §3.3.3.4.

- p.25, line -1. Replace §3.3.2.2 by §3.3.3.2.
- p.35, line -3. Replace th.4.5 by th.4.6.
- p.36, line -7. Replace cf. [Se 84, p.81] by cf. §4.6.2.
- p.46, line 18. Replace $\Psi^{k+k'}$ by $\Psi^{kk'}$.
- p.57, line 21. Replace 5.2.1. Densities by 5.2.2. Densities.
- p.58, line -8. Replace 5.2.2 by 5.2.3.
- p.60, line -4. Replace twice Aut by Out .
- p.68, line 8. Replace §3.3.2.2 by §3.3.3.2.
- p.68, line 10. Replace §3.3.2.2 by §3.3.3.2.
- p.68, line 13. Replace §3.3.2.3 by §3.3.3.3.
- p.69, line 1. Replace This shows that by Hence.
After the image , add $(g_{p,i,n})$. The modified line should then be :
Hence $N_X(p)$ mod ℓ^n depends only on the image $(g_{p,i,n})$ of g_p in the
- p.69, line 2. Replace §3.3.2 by §3.3.3.
- p.70, line 5. Replace §3.3.2.2 by §3.3.2.
- p.70, line 7. Replace th.6.2 by th.6.3.
- p.71, line 20. Replace th.6.2 a) by th.6.3.
- p.71, line 22. Replace §3.3.2.1 by §3.3.2. Replace th.6.2 d) by th.6.3 d).
- p.71, line 27. Replace th.6.15 by th.6.17.
- p.80, line 18. Replace §6.1.2 by §6.2.1.
- p.86, lines 16, 18, 20, 24. In each of these four lines there occurs a minus sign which should be replaced by a boldface minus sign “ **−** ”, similar to the one which appears on line 21.
- p.86, line -2. Replace is smooth by is proper and smooth.
- p.92, lines 3, 5, 17. Replace (three times) $N_p(X)$ by $N_X(p)$.
- p.98, line 7. Replace Proposition 7.9 by Proposition 7.10.
- p.119, line 15. Replace Proof of 8.1.4.2 by Proof of 8.1.4.1.
- p.119, line 17. Replace the minus sign by a boldface minus sign “ **−** ”.
- p.119, line 21. Replace uppe by upper.
- p.121, line -11. Replace X by X_1 .
- p.121, line -10. Replace Y by X_2 .
- p.121, line -5. Replace §8.5.4 by §8.5.5.
- p.121, line -1. The letter Q in Γ_Q should be boldface.
- p.122, line 1. The letter Q in Γ_Q should be boldface.
- p.122, line 4. Replace G by G_X .
- p.123, line -9. Insert a blank space before Other axioms.
- p.124, line 16. Replace totaly by totally.
- p.129, line -1. Replace [SS 12] by [Sa 12].

- p.133, line 13. Replace Corollary 7.1.3 by Corollary 7.13.
- p.134, line 2. Add a dot after cf .
- p.136, line 9. Replace there exists $t \in$ by there exists $t' \in$.
- p.140, line -9. Replace §9.4.3 by §9.4.2.
- p.141, line 7. Replace It will be then by It will then.
- p.141, line 11. Replace restrited by restricted.
- p.141, line 20. The letter A is lacking in front of the formula. The left side of it should be $A_T^1(f, x) =$.
- p.142, line 4. Replace φ by ψ .
- p.143, line -1. Delete the vertical bar on the left, just after $\frac{1}{|G|}$. The formula should be $\frac{1}{|G|} \sum_{g \in G} \dots$
- p.149, reference [EJ 10]. Replace arXiv : 1006.0721 by Geom. Dedicata 159 (2012), 29-40.
- p.149, reference [FKRS 11]. Replace in preparation by Compos. Math.148 (2012), 1390-1442.
- p.151, reference [KP 99]. Replace Jaczorowki by Jaczowski .
- p.152, reference [SS 12]. Replace by :
[Sa 12] T. Saito, *The discriminant and the determinant of a hypersurface of even dimension*, Math. Research Letters 12 (2012), 855-871.
- p.159, line -5. Replace 3.3.2 by 3.3.3.
- p.161, line 9. Replace 3.3.3.2 by 3.4.1.2.
- p.162, line -1. Replace 3.3.2 by 3.3.3.2.

Finite Groups - an Introduction, first edition, International Press, 2016

[The errors pointed out below have been corrected in the revised second edition, published by International Press in January 2022.]

About half of these corrections are taken from the home page of Bjorn Poonen.

Besides B. Poonen and myself, the following people have contributed to this list : Anlong Chua, Peter Mizes, Timothy Ngotiaoco, Ahaan Rungta, Adam Theriault-Shay, Chase Vogeli.

Another half was contributed by J. Sangroniz.

- p.1, *Note*. Replace $G \times X$ by $X \times G$.
- p.1, Definition 1.2. Add “and every $x \in X$ ” after “every $g \in G$ ”.
- p.2, lines 4-5. Definition 1.5 : faithful, free, torsor should be boldface (not just their first letters).

- p.2, *Example*. Replace “automorphisms” by “permutations”.
- p.2, line 27. Replace “We have” (before (1.2)) by “By (1.1), we have”.
- p.5, Definition 1.8. Replace “ $i = 1, \dots$ ” by “ $i = 0, \dots$ ”.
- p.8, line 14. Replace that line by “ $H.G_1 = G_1 \times G_2$. Since both H and G_2 normalize N_1 , this shows that $G_1 \times G_2$ ”.
- p.9, lines 11,12,13. Replace “ $(y, 1, v)$ ” by “ $(y, 1, \dots, 1, v)$ ” and replace “ $(xyx^{-1}y^{-1}, 1, 1)$ ” by “ $(xyx^{-1}y^{-1}, 1, \dots, 1)$ ”.
- p.10, exerc.5. Replace $(H : H') = 3$ by $(H : H') = 2$.
- p.10, exerc.7(a). Replace x/h by h/x .
- p.11, exerc.11(i). Replace “ $gx_i = y_i$ for $i = 1, 2$ ” by “ $gx_1 = x_2$ and $gy_1 = y_2$ ”.
- p.13, exerc.21. In the final sentence, replace \mathcal{S}_q by C_q (cyclic group of order q).
- p.18, line 8. Replace “imply” by “implies”.
- p.18, proof of prop.2.11(2). Replace $(G : H)$ by $(G : S)$.
- p.19, line 7. Replace H by S in the first sentence of §2.4.
- p.24, exerc.3(b), middle of the Hint. Replace “ordre” by “order”.
- p.25, exerc.7(b). The last displayed line should be

$$x_m \mapsto x_m + a_m(x_1, \dots, x_{m-1}),$$

with m instead of n each time it occurs.

- p.25, exerc.8(b). Replace “The of G ” by “The conjugation action of G ”.
- p.26, exerc.9. Rewrite that exercise as follows :
Let J be the set of 5-Sylow subgroups of \mathcal{S}_5 . We have $|J| = 6$.
- a) Use the action of \mathcal{S}_5 on J to show that \mathcal{S}_5 is isomorphic to a transitive subgroup H of \mathcal{S}_6 .
- b) Use the action of \mathcal{S}_6 on \mathcal{S}_6/H to define an automorphism of \mathcal{S}_6 which is not inner¹.
- p.26, footnote 3. Replace the letters c, s by x, y , in order to avoid a conflict with the use of “ c ” in exerc. 15(a).
- p.27, exerc.15(b), line 2. Delete one of the two commas after c .
- p.27, exerc.15(d). In the Hint, replace “ S -conjugation” by “ S -conjugacy”.
- p.27, exerc.15(e). In the Hint, replace twice a_1 by a_0 .
- p.27, exerc.2.16(b). Replace $q \equiv 3 \pmod{16}$ by $q \equiv \pm 3 \pmod{8}$.
- p.28, line 3. Replace “prop.2.4” by “cor.2.15”.
- p.30, line 5. Replace $|K| \leq 3$ by $|K| = 2$.
- p.31, Corollary 3.3. Rewrite the proof of (i) as follows :

Choose an abelian subgroup A of G having property (3) of prop.3.2, and take for N the set of $a \in A$ with $a^p = 1$, where p is a prime divisor of $|A|$.

p.32, line 8. Extend the definition of B_i to all $i \geq 0$ by putting $B_i = 1$ for $i \geq n$; similarly, define V_i to be 0 for $i \geq n$.

p.32, line -8. Replace “condition (2)” by “condition (2)’”.

p.37, Proposition 3.17. Replace “ p -group” by “finite p -group”.

p.37, footnote. Replace “ K -linear projector $K' \rightarrow K$ ” by “ K -linear projector of K' onto K ”.

p.38, th.3.18 (3). Remove the word “proper”.

p.38. Rewrite the proof of th.3.18 as follows :

Proof. (1) follows from the fact that G is nilpotent, cf. cor.3.12; it implies (2). For (3), it is enough to prove the existence of H_2 with $H \subset H_2 \subset G$ and $(G_2 : H) = p$. To do so, use induction on $|G|$. If $N_G(H) \neq G$, apply the induction assumption to $N_G(H)$. If $N_G(H) = G$, choose a subgroup of G/H of order p and take for H_2 its inverse image in G .

p.38, th.3.20 (5). Replace “Two elements” by “Any two elements”.

p.39, line -2. Replace “cor.3.18” by “part (4) of th.3.18”.

p.41, line -5. Replace “ $((a(zb))z)\bar{z}$ ” by “ $((az)z)b\bar{z}$ ”.

p.42, proof of th.3.23. Replace (12 times) “ $i(g)$ ” by “ $i(s)$ ”.

p.43, proof of th.3.27. Replace “the theorem above” by “th.3.26”.

p.44, line 4. Replace “assume” by “Assume now”.

p.44, line 11, proof of prop.3.29. Replace $t(g)e(g)t(g')e(g') = t(gg').e(g)e(g')$ by $g.e(g)g'.e(g') = gg'.e(gg')$.

p.46. Remove exerc.1, since it has already been done in cor.3.3 (ii).

p.46, exerc.2 (iii). Replace “exists” by “exist”.

p.47, lines 1 and 2. Replace “ x, y ” by “ u, v ”.

p.47, line 5. Replace “ b_1 ” by “ b_2 ”.

p.47, line 7 of exerc. 7. Replace “ $\lambda \in k$ ” by “ $\lambda \in K$ ”.

p.47, line 8 of exerc. 7. Replace “of U ; this proves a). As for e)” by “of \tilde{U} ; this proves e). As for a)” .

p.47, exerc. 8 a). Delete the hypothesis that the A_i/A_{i+1} are abelian. Add : [Hint : Let $g \in G_n$. Show that g acts on A_i/A_{i+n+1} by $x \mapsto xz$, for some $z \in A_{i+n}/A_{i+n+1}$. If $h \in G_1$, show that hgh^{-1} acts on A_i/A_{i+n+1} by $x \mapsto xh(z)$. Since h acts trivially on A_{i+n}/A_{i+n+1} , conclude that $g^{-1} \cdot hgh^{-1}$ acts trivially on A_i/A_{i+n+1} , hence belongs to G_{n+1} .]

p.48, exerc.13 d). Replace “denotes” by “denote”.

p.53, line 8. Replace “ $C^{n+1}(g, A)$ ” by “ $C^{n+1}(G, A)$ ”.

- p.54, line -6. Replace “obtain” by “obtains”.
- p.58, line 7. Replace by “have $h'(x) = a \cdot x a^{-1} h(x) = ah(x)a^{-1}$.”
- p.58, Theorem 4.13. Replace “of G ” by “of E ”.
- p.59, line 5 of §4.5.1. Replace “composition” by “composition”.
- p.59, line 4 of §4.5.2. Replace $\text{Out}(G)$ by $\text{Out}(A)$, and $\text{Aut}(G)$ by $\text{Aut}(A)$.
- p.59, th.4.16. Replace “is and only if” by “if and only if”.
- p.59, line -9. Replace “and f ” by “and φ ”.
- p.60, formula (4.10). Replace “ $e \bullet_f e'$ ” by “ $e *_f e'$ ”.
- p.60, line after Theorem 4.17. Replace “ $H^2(G, A)$ ” by “ $H^2(G, Z(A))$ ”.
- p.61, line 10. Delete the second occurrence of A' .
- p.61, lines 2-4 of the proof of th.4.20, part II. After “ $E = A.E'$.”, add “Hence the homomorphism $E' \rightarrow G$ is surjective; its kernel A' is equal to $E' \cap A$ and we have the exact sequence $1 \rightarrow A' \rightarrow E' \rightarrow G \rightarrow 1$.”
- p.62, proof of th.4.20, part III, lines 3-4. Replace “Let p ... its inverse image” by : “We may assume that $G \neq 1$. Then, by cor.3.3(i), G has a nontrivial abelian normal p -subgroup I for some prime p . Let \tilde{I} be its inverse image”.
- p.62, proof of th.4.20, part III, line 7. Replace “ I_1 by aI_1a^{-1} ” by “ G_1 by aG_1a^{-1} ”.
- p.62, proof of th.4.20, part III, line 10. After “ G_1 and G_2 are conjugate”, add “by an element of $A \cap N$ ”.
- p.63, Note after Proposition 4.23. Replace “ $G_{\psi'}$ ” by “ $\psi'_0(G)$ ” and replace “ G_{ψ} ” by “ $\psi_0(G)$ ”.
- p.65, exerc.2(b). The identity should be “ $\partial_i \partial_j F = \partial_j \partial_{i-1} F$ if $i > j$ ”.
- p.66, line 8. Replace “ $z^{n/4}$ ” by “ $z^{n/2}$ ”.
- p.66, exerc.5, case (ii) : Replace “agument” by “argument”, “same image” by “same images”, and “than” by “as”.
- p.66, exerc.7(b), Hint. Replace H by A .
- p.67, exerc.8. Replace $(1, z)$ by $(1, nz)$.
- p.67, exerc.8(a). Replace (g, z) by $(g, 0)$.
- p.67, titles of exerc.10 and 11. Replace “ $H^2(G, A)$ ” by “ $H^2(G, Z(A))$ ”.
- p.68, line 10. Replace “ $\psi(c)$ ” by “ $\psi(s)$ ” and replace “ a ” by “ x ”.
- p.68, line 17. Replace “ $Z(A)_D/Z(A)^T$ ” by “ $Z(A)_T/Z(A)^D$ ”.
- p.68, lines 12, 13. Replace “ $Z(A)_D$ ” by “ $Z(A)^D$ ” and replace “ $Z(A)^T$ ” by “ $Z(A)_T$ ”.
- p.69, exerc.16(c), Hint. Replace “prop.4.22” by “cor.4.22”.
- p.70, line -14. Delete the letter “ n ” in can be written uniquely n ”.
- p.71, just before th.5.4. Replace “ th.8.21” by “th.8.62”.

- p.73, proof of th.5.9. In the sentence after the display, replace “th.4.6” by “th.4.20(1)”.
- p.74, proof of prop.5.11(1). Replace “ p -Sylow” by “ π -Sylow”.
- p.75, proof of th.5.13. Replace “lemma 5.8” by “cor.5.8”.
- p.79, th.6.6. In (1’), “after “such that”, replace “ $\mathfrak{q}O_K$ is the p -th power of an ideal of O_K ” by “ p divides the residue field degree $[O_K/\mathfrak{q}_K : O_k/\mathfrak{q}]$ for every prime ideal \mathfrak{q}_K of O_K lying above \mathfrak{q} ”.
- p.83, lines -6,-7. Replace (four times) “ n ” by “ m ”.
- p.83, line -5. Replace “ G ” by “ H ”.
- p.84, proof of th.6.13 (1) \Rightarrow (2). Replace “If p a prime factor . . .” by “If p is a prime factor . . .”.
- p.85, comment after the proof of cor.6.14. Replace “property 6.14” by “property \mathcal{F} ”.
- p.86, line 3. Replace “exerc.6” by “exerc.11”.
- p.86, exercice. 1 d). Add the assumption that G acts faithfully on X .
- p.86, exerc.3. Add “, except 18,” after “in this list”. Rewrite the next sentence as “Show that there are two non isomorphic Frobenius groups of order 18; same question for the orders 42 and 48”.
- p.86, exerc.4. Replace “as” by “has”.
- p.94, proof of prop.7.18. On the first line, add “of minimal order” after “odd order $N < 2000$ ”; delete the product sign in front of “ $p_1^{m_1} \dots p_n^{m_n}$ ”. On the sixth line, replace “number” by “numbers”.
- p.95, line 15. Replace “(mod 5))” by “(mod 5)”.
- p.96, line 11. Replace “ $(c + id)$ ” by “ $(ci + d)$ ”.
- p.96, lines 16 and 22. Replace “ P ” by “ \mathbf{P} ”.
- p.96, line 18. Replace “th.7.15” by “Th.7.15”.
- p.96, line 27. Replace “ $w(2\lambda) = 4\lambda$ ” by “ $w(2\lambda) = 4$ ”, and replace “ $w(4\lambda) = 2\lambda$ ” by “ $w(4\lambda) = 2$ ”.
- p.101, exerc.9(b), Hint. Replace “transfert” by “transfer”.
- p.102, exerc.17 b). Delete the sentence “Hence the action of B/U on $\mathbf{P} - \{\infty\}$ is faithful.”
- p.102, exerc.17 d). Replace the second sentence by “Use Th.7.5 to prove the existence of $w \in G$ such that $t.wt^{-1} \in D(B) = U$; by replacing w by uw with a suitable $u \in U$, show that one can achieve $t.wt^{-1} = 1$.”
- p.106, second line of the proof of prop.8.5. Delete one of the two commas of “every $i,$, ”.
- p.109, line 3. Replace “ $f(\rho_1(g))(x)$ ” by “ $f(\rho_1(g)(x))$ ”.
- p.110, Proof of Proposition 8.16. Replace “By th.8.4” by “By th.8.15”.

- p.112, line 1. Replace “ $\chi \in \text{Irr}$ ” by “ $\chi \in \text{Irr}(G)$ ”.
- p.118, Example 3. Replace “ C_p ” by “ C_g ”.
- p.121, line 9. Replace “th.8.5” by “th.8.22”.
- p.121, proof of lemma 8.49. Replace “ V ” by “ E ” (three times).
- p.122, line -12. Replace “ $V_0 \otimes_{\mathbf{R}} \mathbf{C}$ ” by “ $\mathbf{C} \otimes_{\mathbf{R}} V_0$ ”.
- p.123, Rewrite lines 2 to 8 as follows :

Let us write $h(x, y)$ as $\langle x, y \rangle$. For every $y \in E$, the map $x \mapsto B(x, y)$ is linear; hence there exists a well-defined $\phi(y) \in E$ such that $B(x, y) = \langle x, \phi(y) \rangle$. The map $\phi : E \rightarrow E$ so defined is antilinear (i.e., such that $\phi(\lambda x) = \bar{\lambda}\phi(x)$) and bijective. Since B is symmetrical, we have :

$$\langle x, \phi(y) \rangle = \langle y, \phi(x) \rangle \quad (8.19)$$

Hence :

$$\langle \phi(x), \phi(y) \rangle = \langle y, \phi^2(x) \rangle. \quad (8.20)$$

- p.124, line 3. Replace “ $\langle \chi^2, 1 \rangle = 0$ ” by “ $\langle \chi^2, 1 \rangle = 0$ ”.
- p.124, line 7. Replace “form” by “forms”.
- p.125, last line. Replace “on G ” by “on H ”.
- p.131, exerc. 4 a). Replace “ $|X_s$ ” by “ $|X_s|$ ”.
- p.131, exerc. 4 b). Replace “ $Z_G(g)$ ” by “ $C_G(g)$ ”.
- p.131, exerc. 4 c). Replace “methof” by “method”.
- p.132, line 5. Replace “ $Z_G(g)$ ” by “ $C_G(g)$ ”.
- p.132, exerc.6(c). Replace by “Construct an example of b) such that G acts transitively both on X and on Y ”.
- p.134, exerc.13 a). Replace the Hint by “Hint : if m is not prime to $|G|$, the m -th power map is not surjective. This implies that the action of Ψ^m on the ring of complex class functions is not injective, hence the same is true for its action on $R(G)$.”
- p.135, exerc. 19. Replace b) by : b) Assume that $|G|$ is divisible by p ; write $|G|$ as $p^m q$, with $(q, p) = 1$. Let f be the function equal to q on the elements of G of order p , and equal to 0 elsewhere. Prove the inclusions $f \in R'(G) - R(G)$ and $p^m f \in R(G)$. Deduce that the index of $R(G)$ in $R'(G)$ is divisible by p .
- p.139, line 7. Replace “apply d)” by “apply b)”.
- p.139, line 9. Replace “central function” by “class function”.
- p.139, line 12. Replace twice “ \iff ” by “ \implies ”.
- p.140, line 2. Replace “denotes” by “denote”.
- p.140, line -3. Replace “ \mathbf{GL}_V ” by “ $GL(V)$ ”.
- p.141, line -2. Replace “ $\langle \tilde{f}, \theta_H \rangle_G$ ” by “ $\langle \tilde{f}, \theta \rangle_G$ ”.

- p.142. Remove the stray symbols +.. after th.9.1.
- p.144, second sentence of §9.1.3. Replace “if x in a non-zero integer” by “if x is a non-zero integer”.
- p.146, last line of 9.1.5. The index n for the symmetric group should be m .
- p.149, proof of part (2) of prop.9.12. The end of the first line should be “ $N(au) = N(a)$ ”. Replace the second line by : “Similarly, $ua.(au)^* = uaa^*u^{-1}$, hence $N(ua) = \text{Tr}(uaa^*u^{-1}) = \text{Tr}(aa^*) = N(a)$.”
- p.152, §9.2.7, complement 2. Delete “the” in “the Lefschetz’s principle” .
- p.152, §9.2.7, end of complement 2. Add : “ See also M.J. Larsen & R. Pink, Finite subgroups of algebraic groups, *J. Amer. Math. Soc.* **24** (2011), 1105-1158.”
- p.153, line -12. Replace “commutent” by “commute”.
- p.154, line -6. Replace “wigth” by “with”.
- p.164, line -2. Replace “J.W.C. Cassels” by “J.W.S. Cassels”.
- p.166, line -6. Replace “polyedral” by “polyhedral”.
- p.170, Index, line 5. Add : Adams operations : 8.8.2.
- p.173, add at the end of the letter-p list : $\Psi^m = m$ -th Adams operation, 8.8.2.
- p.173, add a new line : “ $R'(G)$: 8.8.1.”

Rational Points on Curves over Finite Fields (with contributions by Everett Howe, Joseph Oesterlé and Christophe Ritzenthaler), S.M.F. Doc. Math. 18, 2020.

- p.viii, line 21. Replace “Chapter 6 is about” by “Chapter 7 is about”.
- p.104, line 5. Replace “. Then :” by “, then”.

J-P. Serre, June 2022