Errata for *Axioms and Hulls*
(last updated 01 March 2025)

Page 4, line -4

$\neg tpr$ …is a convex $\leadsto$ $|tpr| \le 0$ implies $|pqr| > 0$ by (1.2), so (1.3) expresses t as a convex

Page 6, line 13

(1.4)and $\leadsto$ (1.4) and

Page 6, line 19

pux, pvx, pwy, qvy, qwy, quz, rwz, ruz, rvx $\leadsto$ pux, pvz, pwy, qvy, qwx, quz, rwz, ruy, rvx

Page 8, equation (2.6a)

$abd, dbc, acd, abd \leadsto abd, dbc, acd, abc$

Page 12, line 3

$str \vee tpq \leadsto str \wedge tpq$

Page 12, line -2

tems $\leadsto$ terms

Page 14, line 18

Macmahon $\leadsto$ MacMahon

Page 16, line 28

labelled $\leadsto$ labeled

Page 20, line 10

$(\sigma_1 \vee \cdots \vee \sigma_1) \leadsto (\sigma_1 \vee \cdots \vee \sigma_k)$

Page 20, in (6.1)

$\bar{\sigma_2} \leadsto \bar\sigma_2$

Page 21, line 1

cf_j, ${}'_j$, c''_j, $\leadsto$ c_j, c'_j, c''_j,

Page 22, line 10

$\bar q rs \leadsto \bar q r \bar s$

Page 23, lines 1 and 2

that when …we $\leadsto$ that $t \in \Delta pqr$ implies $t \to p \vee q \to t$, $t \to q \vee r \to t$, and $t \to r \vee p \to t$. Hence we

Page 23, line 12

$e^{i\theta j} \leadsto e^{i\theta_j}$ (twice)

Page 23, line 15

[61] $\leadsto$ [68]

Page 24, line 6

$$\begin{array}{ccc} 0 & \to & 1 \\ \uparrow & \nwarrow\!\!\!\!\swarrow & \uparrow \\ 4 & \to & 6 \end{array} \qquad \leadsto \qquad \begin{array}{ccc} 0 & \to & 1 \\ \uparrow & \nwarrow\!\!\!\!\swarrow & \uparrow \\ 4 & \leftarrow & 6 \end{array}$$

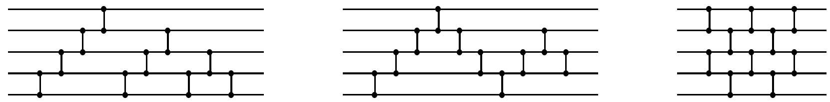
Page 25, line 3

contains $p \to q$ $\leadsto$ contains $r \to p$

Page 29, line 1

adjaciences $\leadsto$ adjacencies

Page 29, replacement for (8.1)



bubble | cocktail-shaker | odd-even (8.1)

Page 30, lines -5 and -2

(5.1) $\rightsquigarrow$ (5.2)

Page 37, line 10

$B^n \rightsquigarrow B_n$

Page 37, line 16

can also be written $\rightsquigarrow$ leads to others such as

Page 37, in (9.7)

$(\alpha''_m + 1) \rightsquigarrow \alpha''_m$

Page 37, line -10

Equations $\rightsquigarrow$ Inequalities

Page 39, line -15

The quantity ... at least, this is $\rightsquigarrow$ Can the quantity 3^n in (9.8) be reduced to $n2^{n-2}$? This, at least, is

Page 39, line -1

large. $\rightsquigarrow$ large. (And alas, the conjecture is false; see section 21.)

Page 40, line -7

one circuit C' $\rightsquigarrow$ on circuit C''

Page 42, line -16

enough imply $\rightsquigarrow$ enough

Page 42, line -10

960 $\rightsquigarrow$ 1920

Page 46, line 10

paths $\rightsquigarrow$ points

Page 46, line -5

(11.3) $\rightsquigarrow$ (11.4)

Page 49, line -13

afer $\rightsquigarrow$ after

Page 50, line 3

$pp't \rightsquigarrow pp't_1$

Page 50, line 6

$t_r p' t_{r-1} \rightsquigarrow t_{r-1} p' t_r$

Page 50, line 10

$t_3 t_2 p' \rightsquigarrow t_3 p' t_2$

Page 50, in (12.5)

$e_{<k} \rightsquigarrow e_{<j}$

Page 51, line 3

$x_{10} \rightsquigarrow c_{10}$

Page 53, line 1

changed $\leadsto$ charged

Page 57, in (14.4)

$^{(}$14.4) $\leadsto$ (14.4)

Page 61, Step 3

$x_r - x_p \leadsto x_r = x_p$

[However, Lyle Ramshaw told me on 19 Nov 1993 that we can omit the clause 'or $x_p = x_q$ and $y_p = y_q$ and $x_r = x_p$ and $y_r \geq y_p$,' since a valid CC system is obtained without this complication.]

Page 64, replacement for the bottom 12 lines

if $(x < y)$	
if $(y < z)$ output (xyz)	$x < y < z$
else if $(z < y)$	
if $(x < z)$ output (xzy)	$x < z < y$
else output (zxy)	$z \leq x < y$
else output (xzy)	$x < y \leq z \leq y$
else if $(y < x)$	
if $(x < z)$ output (yxz)	$y < x < z$
else if $(y < z)$ output (yzx)	$y < z \leq x$
else output (zyx)	$z \leq y < x$
else if $(x < z)$ output (xyz)	$x \leq y \leq x < z$
else output (zyx).	$z \leq x \leq y \leq x\,.$

Page 72, line -11

same sign $\leadsto$ same sign as

Page 73, line 9

$\bar{a}, q, r, s\} \leadsto \{\bar{a}, q, r, s\}$

Page 73, line 24

allpoints $\leadsto$ all points

Page 78, line -10

$pt_j t_{j-1} t_{j-2} \leadsto pt_{j-1} t_{j-2}$

Page 81, line -14

1000 n-gon $\leadsto$ 10000 n-gon

Page 86, line -6

labelled $\leadsto$ labeled

Page 87, line 8

$p_1, \ldots, p_k \leadsto p_1 \;\ldots\; p_k$

Page 87, line 10

labelled $\leadsto$ labeled

Page 88, line -13

$p'_1, \ldots\; p'_{r-2} \leadsto p'_1 \;\ldots\; p'_{r-2}$

Page 91, line 8

fours $\leadsto$ form

Page 91, line 23

$t_n \leadsto t_m$

Page 91, line 27

$t_m t_{m-1}, \ldots, t_1 \leadsto (t_m, t_{m-1}, \ldots, t_1)$

Page 95, line 11

48, 50 $\leadsto$ 48, 51

Page 97, lines 15 and 16

Laffaile $\leadsto$ Laffaille   (twice)

Page 97, new material just before section 22

Addendum, added March 2025: A paper by Stephan Felsner and Pavel Valtr, "Coding and counting arrangements of pseudolines" [*Discrete & Computational Geometry* **46** (2011), 405–416] proves that the constant 3 in the theorem of section 9 can be improved to 2.487. It also mentions that Ondřej Bílka has disproved the conjecture following that theorem, by constructing reflection networks with $\Omega(2.076^n)$ cutpaths.

A paper by Xavier Goaoc and Emo Welzl, "Convex hulls of random order types" [*Journal of the ACM* **70** (2023), 8:1–8:47] shows among other things that the average number of points on the convex hull of a random n-point CC system is $4 - 8/(n^2 - n + 2)$.

Page 100, near the top

I meant to cite also the paper by Franz Aurenhammer, "Voronoi diagrams — a survey of a fundamental geometric data structure," *ACM Computing Surveys* **23** (1991), 345–405.

Page 100, reference [5]

(1992) $\leadsto$ (1993)

Page 100, reference [7]

in preparation. $\leadsto$ unpublished preprint.

Page 100, reference [13]

Krystallographie $\leadsto$ Kristallographie

Page 101, reference [19]

SIAM ... 108–123. $\leadsto$ *SIAM Journal on Computing* **22** (1993), 418–429.

Page 102, reference [32]

1992), to appear. $\leadsto$ 1993), 103–134.

Page 102, reference [34]

London Interscience $\leadsto$ London: Interscience

Page 102, reference [37]

Algorithmica, to appear. $\leadsto$ *Algorithmica* **9** (1993), 534–560.

Page 103, reference [45]

Addison-Wesley $\leadsto$ Addison–Wesley

Page 103, reference [47]

, book in preparation. $\leadsto$ (New York: ACM Press, 1994), viii + 576 pp.

Page 103, reference [54]

Discrete ... 1990. $\leadsto$ *Syomposium on Computational Geometry* **6** (1990), 16–22.

Page 104, reference [59]

331-332 $\leadsto$ 331–332

Page 104, reference [60]

probléme $\leadsto$ problème

Page 104, reference [61]

realisierbarkeitskriterien $\rightsquigarrow$ Realisierbarkeitskriterien
Giessen $\rightsquigarrow$ *Gießen*

Page 104, reference [69]

133 (1907) $\rightsquigarrow$ **133** (1908)

Page 104, reference [71]

Eidgenossische $\rightsquigarrow$ Eidgenössische

Page 105, new entry

Aurenhammer, Franz, 100.

Page 105, new entry

Bílka, Ondřej, 97.

Page 105, entry for Bokowski

95, 96 $\rightsquigarrow$ 95–97

Page 106, left column, line 1

vii $\rightsquigarrow$ vii.

Page 106, left column

Dress, Andreas $\rightsquigarrow$ Dress, Andreas Walter Martin

Page 106, new entry

Felsner, Stephan, 97.

Page 106, new entry

Goaoc, Xavier, 97.

Page 107, entry for Lawrence

95 $\rightsquigarrow$ 95–96

Page 107, left column

Macmahon $\rightsquigarrow$ MacMahon

Page 108, entry for perturbations

59-60 $\rightsquigarrow$ 59–60

Page 109, top line of left column

instructions! 74 $\rightsquigarrow$ instructions, 74

Page 109, new entry

Valtr, Pavel, 97.

Page 109, entry for Welzl

103 $\rightsquigarrow$ 97, 103