

Index

Symbols

◦ 250
* 249
+ 248, 257
- 249
.. 265
/ 249
< 253
<= 253
== 253
> 253
>= 253
% 254
& 254
_ 261
^ 249
| , | 250, 277
| | 250, 277
3D 429

A

abs 252
acceleration 167
accelerometer 204
accuracy 198
actuation 191, 198, 205
add 250
add circle 81
add circle by fixed radius 83
add circle by radius 51, 82
add conic 89
add line 44, 76
add locus 55, 103
add point 42, 74
add segment 84
add text 97
addForce 394
adj 277
affine transformation 131, 327, 353
algorithm 384
allcircles 271

allconics 271
alllines 271
allmasses 271
allpoints 271
allsegments 271
allsprings 271
alpha 284
alpha (property) 236
amplitude 191
amplitude (property) 194, 239
amsdata 392
analytic function 39
and 254
and 255
angle 36, 80, 93, 95, 127
angle (property) 237
angle bisector 86
angle mark 93
animation 54, 107, 205
and CindyLab 109
and CindyScript 109, 391
pause 107
play 107
speed 107, 109
stop 107
animation control panel 107, 175
appearance 46, 156
appearance stack 344
append 266
applets 419
apply 267
arc 93
arccos 251
arcsin 251
arctan 251
arctan2 251
area 93, 96
area 351
arrow 162
in TeX 320
assert 389
atomic decay 186

- attribute 240, 241, 445
- audio 377
- autoclearlayer 346
- B**
- background image 163, 323
- background layer 346
- ball 203
- baseline 314
- basis 138, 352
 - projective 342
- basis stack 344
- bitmap 332
- blue 284
- boolean expression 253
- bouncer 196
- branches 243
- bridge 170, 192, 211
- button 99, 237, 392
- C**
- CAD 9, 28
- calculation 100
- calculus 355
- calibratedamsdata 392
- candisplay 311
- canvas 332
- canvas 335, 336
- caption (property) 236
- Cayley-Klein geometries 8, 36
- ceil 252
- center 86
- center (property) 237
- change label 97
- characters 257
- charge 175, 202
- charge (property) 178, 238
- Charlie Parker 377
- CindyLab 11–14, 56, 167–216
 - and animations 109
 - and CindyScript 207, 212
- CindyScript 14–20, 58, 219–412
 - and animations 109
 - and CindyLab 170, 207, 212
- circle 51, 81, 82
 - by center and fixed radius 83
 - by center and perimeterpoint 81
 - by center and radius 51, 71, 82
 - by compass 87
 - by three points 89
 - reflection 88, 128
- circle 336
- circle inversion 88, 128
- circular arc 93
- clear 247
- clearconsole 388
- clearimage 332
- clickable button 99
- clip 337
- clipping 158
- clock 389
- closeconnection 388
- closefile 387
- clrscr 345
- color 157, 283, 319, 410
 - of a locus 104
- color 283
- color (property) 236
- color plot 19
- colorhsb (property) 236
- colorplot 298
- column 275
- columnmatrix 276
- common 266
- communication 387
- comparison 253
- compass 87
- complex 352
- complex numbers 27, 32
- composition of transformations 134
- concat 266
- conic 110, 209
 - by center and principal axis 111
 - by five lines 110
 - by five points 89
 - by four lines and a point 111
 - by four points and a line 111
 - ellipse 89
 - hyperbola 90
 - inscribed 111
 - parabola 90
- conjugate 252
- connect 288
- connecting line 350
- consecutive 269
- consistency 9
- construction text 121
- contains 266
- continuity 39
- control flow 221, 243
- convex hull 279
- convexhull13d 279
- coord (property) 237
- coordinates
 - rotation 340
 - scaling 340
 - translate 340
- copy 415
- cos 251
- Coulomb force 191, 194
- coupled oscillator 171
- create 383
- createimage 332
- createpoint 383
- createtool 392
- createvar 246
- cross 351

cross product 351
 cross ratio 36
 crossratio 352
 curve plotter 171
 cycle 269

D

d 355
 damping 188, 194, 196
 data type 222
 date 390
 debugging 388
 decay 186
 definition mode 84
 definition of functions 229
 derivative 355
 det 276, 351
 determinant 351
 differential equation 168
 directproduct 269
 directrix 90
 dist 277
 distance 36, 93, 94
 div 250
 docking 97
 Dormand Prince 169
 drag mode 43, 53, 71
 draw 285, 287, 337
 drawall 288
 drawcircle 290
 drawcurves 307
 drawfield 301
 drawfieldcomplex 303
 drawforces 304
 drawimage 323, 325, 327, 328
 drawing 6
 drawpoly 289
 drawtable 311
 drawtext 309
 dynamic geometry 5–11, 28

E

eigenvalues 278
 eigenvectors 278
 electrostatic field 194, 395
 element 382
 elementsatmouse 382
 ellipse by foci 89
 elliptic geometry 83
 emptylayer 345
 environment 174, 197
 equality 253
 equation 99
 equilibrium 209
 err 388
 error handling 225
 euclidean geometry 8, 35, 93, 114, 116
 Euler line 6

eval 246
 even 256
 events 227
 exercise 433–437
 exp 251
 export 419
 HTML 109
 PDF 122
 extensions 427

F

f (property) 178, 238, 239
 factor (property) 180, 239
 fetch 117
 field
 electrostatic 172, 194, 395
 force 213
 files 385
 fill 337
 fillcircle 290
 fillplot 296, 297
 fillpoly 289
 flatten 269
 floor 194
 floor 252
 flush 388
 flux 172
 focus 89, 90
 fontfamilies 311
 fonts 311
 forall 246, 267
 force 167, 172, 180, 199
 force 395
 force field 56, 183, 185, 213, 304, 395
 forces
 in equilibrium 209
 format 260
 formula typesetting 314, 316
 fractal 10, 141, 411
 friction 175, 188, 199
 friction (property) 178, 187, 201,
 238–240, 394
 function 16, 99, 135, 229
 plot 102
 function plotting 291, 409
 functional programming 17, 220
 fx (property) 178, 238
 fy (property) 178, 238

G

gauss 352
 geometries 8, 114, 116
 geometry
 dynamic 5–11, 28
 euclidean 8, 35, 114, 116
 hyperbolic 8, 78, 83, 114, 116, 151
 non-euclidean 35, 93
 projective 8, 27, 30

- spherical 8, 114, 116
- geotype 351
- gestures 423
- Golden Gate Bridge 211
- graphics context 344
- gravitational force 56, 183, 191, 213
- gravity 180, 199, 203, 392
- gravity (property) 201, 240, 394
- gravity hardware 204
- gray 284
- greek 320
- green 284
- greset 282, 344
- grestore 282, 344
- groove 377
- group 10, 144, 145
- gsave 282, 344
- guess 260, 357

H

- halfplane 337
- hermiteanproduct 277
- home 118
- homog (property) 237
- homogeneous coordinates 31
- Hook's law 189
- HTML 419
- HTML export 109, 419–422
- hue 284
- hull 279
- hyperbola by foci 90
- hyperbolic geometry 8, 78, 83, 93, 114, 116, 151

I

- if 243
- IFS 10, 137, 141, 148
- im 252
- image 163
- imagergb 331
- imagerot (property) 237
- imagesize 331
- import 386
- incidences 382
- indexof 258
- infinity 48
- input 385
- inputs 384
- inspect
 - appearance 156
 - arrow 162
 - bouncer 197
 - clipping 158
 - color 157
 - defaults 159
 - environment 198
 - floor 195
 - gravity 182

- IFS 142
- info 155
- locus 104
- magnetic field 187
- mass 175
- opacity 157
- overhang 159
- rubber band 189
- size 158
- spring 189
- sun 184
- trace 160
- velocity 179
- view 163
- inspect 384, 385
- inspector 46, 153
- installation 25
- instrument 373
- instrumentnames 374
- integer relations 357
- integer sequence 265
- interactive exercise 7, 433–437
- interactive modes 74
- intersection 92, 349
- inverse 277
- inverse (property) 238
- inverse transformation 133
- inversion 88, 128
- iscircle 257
- iscomplex 256
- isconic 257
- iseven 256
- isgeometric 256
- isinteger 255
- iskeydown 391
- isline 257
- islist 256
- ismass 257
- ismatrix 256
- isnumbermatrix 256
- isnumbervector 256
- isodd 256
- ispoint 256
- isreal 255
- isselected 256
- isshowing (property) 236
- isspring 257
- isstring 256
- issun 257
- isundefined 257
- iterated function system 10, 137, 141, 148
- iteration 145

J

- Java 23, 427
- JavaScript 387, 431
- javascript 387, 432
- jazz 377

- JOGL 429
- join 44, 76
- join 350
- Julia set 137, 411
- K**
- kaleidoskope 149
- ke (property) 178, 201, 238, 240, 394
- Kepler ellipse 56
- Kepler's law 210
- key 391
- keyboard input 391
- keydownlist 392
- keys 247
- kinetic (property) 178, 201, 238, 240, 394
- kinetic energy 178
- L**
- l (property) 194, 239
- label 97
- labelled (property) 236
- layer 344
- ldiff (property) 194, 239
- Lego Mindstorms 429
- length 258, 265
- license 26, 422
- line 31
 - angle bisector 86
 - at infinity 48
 - by two points 44, 76
 - orthogonal 80
 - parallel 78
 - perpendicular 80
 - polar of a point 91
 - reflection 88, 128
 - trough point 77
 - with fixed angle 80
 - with slope 71
- line 352
- linear algebra 276
- linearsolve 278
- linecolor 283
- linereflect 352
- linesize 282
- linkage 51
- load 385
- local variable 246
- locus 55, 103
- locusdata 385
- log 251
- loop 243
- lrest (property) 194, 239
- M**
- Möbius transformation 132
- macro 415
- magnetic field 185
- many-particle system 200, 201
- map 123
- map 353
- mapgrid 305
- mapimage 329
- mapping of elements 135
- mass 56, 167, 175
- mass (property) 178, 238, 239
- Mathe-Vital 442
- matrix 224, 272, 276
 - typesetting 317
- matrix (property) 237, 238
- matrixrowcolumn 275
- max 274
- measurement 35, 93
 - angle 95
 - area 96
 - distance 94
- media browser 323
- meet 45, 74, 92
- meet 349
- mesh 117
- message 389
- MIDI 362
- midiaddrack 371
- midichannel 375
- midicontrol 375
- midiposition 373
- midispeed 372, 373
- midistart 372
- midistop 372
- midivolume 375
- midpoint 83
- min 274, 275
- mirror 88
- mod 251
- mode
 - add center 86
 - add circle 81
 - add circle by fixed radius 83
 - add circle by radius 51, 82
 - add line 44, 76
 - add midpoint 83
 - add orthogonal 80
 - add parallel 78
 - add perpendicular 80
 - add point 42, 74
 - add segment 84
 - angle bisector 86
 - angle mark 93
 - animation 54, 107
 - arc 93
 - circle by three points 89
 - compass 87
 - conic 110
 - conic by five points 89
 - define a Möbius transformation 132
 - define a projective transformation 131
 - define a reflection 128

- define a rotation 127
 - define a similarity 128
 - define a translation 125
 - define an affine transformation 131
 - define composition of transformation 134
 - define inverse transformation 133
 - define transformation by function 135
 - ellipse by foci 89
 - function 99
 - hyperbola by foci 90
 - intersection 92
 - line through point 77
 - line with fixed angle 80
 - locus 55, 103
 - mirror 88
 - move 43, 53, 71
 - parabola by focus and directrix 90
 - polar of a line 91
 - polar of a point 91
 - polygon 91, 112
 - reflection 88
 - regular polygon 112
 - text 97
 - transformation 122
 - modifier 223
 - momentum 203
 - motion sensor 392
 - mouse 391
 - mouse coordinates 391
 - move mode 43, 53, 71
 - mover 103, 107
 - mover 382
 - moveto 381
 - mtlocal 440
 - mult 250
 - multitouch 438
 - music 362–377
- N**
- n-body system 203
 - name (property) 236
 - network license 26
 - networking 387
 - newline 310
 - Newton's law 56, 167, 175
 - non-euclidean geometry 35
 - not 255
 - not 255
 - notes 362–377
 - numerical integration 169, 197
 - NXT 429
- O**
- odd 256
 - opacity 157
 - openconnection 387
 - openfile 386
 - openurl 387
 - operating system 24
 - or 254
 - or 255
 - order 261, 270
 - orientation 96
 - ornament 149
 - Ornithology 377
 - orthogonal 80
 - orthogonal line 350
 - oscillator 171
 - oscilloscope 212, 307
 - output 385
 - overhang 159
 - overline 317
- P**
- pairs 268
 - Pappus's theorem 42
 - parabola by focus and directrix 90
 - parallel 78
 - parallel 350
 - parse 260
 - paste 415
 - paths 336
 - pauseanimation 391
 - PDF 122
 - pe (property) 183, 185, 194, 201, 239, 240, 394
 - pendulum 192, 203
 - perpendicular 80
 - perpendicular 350, 351
 - phase 191
 - phase (property) 194, 239
 - physics 11–14, 167
 - pixel 331, 346
 - pixel color 331
 - planet 56
 - planet movement 210
 - playanimation 391
 - playfrequency 367
 - playfunction 379
 - playmelody 371
 - playsin 379
 - playtone 366
 - playwave 380
 - plot 102
 - plot 291, 296
 - plugin 427
 - Poincaré disk 119
 - point 31
 - center 86
 - free 42, 74
 - in simulation 172
 - midpoint 83
 - on a circle 71, 74
 - on a conic 71, 74
 - on a line 71, 74
 - polar of a line 91

- reflection 88, 128
- point 352
- pointcolor 283
- pointreflect 353
- pointsize 282
- polar
 - of a line 91
 - of a point 91
- polygon 91, 112, 185
- polyhedron 336
- polytope 279
- pos (property) 238
- posx (property) 238
- posy (property) 238
- potential (property) 183, 185, 194, 201, 239, 240, 394
- potential energy 182, 185, 193
- pow 250
- prepend 267
- pressed (property) 237
- print 386–388
- println 386–388
- product 274
- programming 14–20
- projection 328
- projective basis 342
- projective geometry 8, 27, 30
- projective transformation 131, 211, 328, 353
- properties 384
- prover 48, 433
- PSLQ 357

Q

- quadratic mesh 117

R

- radius 83, 203
 - of a mass 175
- radius (property) 178, 237, 238
- random 252
- randombool 252
- randomint 252
- randomnormal 252
- re 252
- readln 388
- recursion 230
- red 284
- redefine 415
- reference points 324
- referencing 97
- reflection 88, 128, 353
- regional 247
- regular polygon 112
- remove 266
- removeelement 383
- removeimage 333
- removetool 394
- removetools 394

- removevar 247
- repaint 385
- repeat 245
- replace 259
- resetclock 390
- rest length 189
- reverse 270
- road 103, 107
- roots 358
- rotate 118
- rotate 340
- rotation 127, 327
- round 252
- row 275
- rowmatrix 276
- rubber band 187, 189, 190
- run (property) 237
- Runge Kutta 169

S

- scale 118
- scale 340
- screen 337
- screenbounds 346
- screenresolution 347
- scribbling 423
- seal 208
- seconds 390
- seedrandom 253
- segment 84
- select 268
- selected (property) 236
- selecting 72
- set 271
- setbasis 342, 343
- setdirectory 386
- setforce 394
- shapes 336
- side effect 101, 221
- similarity 128, 353
- simulate (property) 178, 183, 185, 187, 194, 196, 197, 238
- simulation 11–14, 167
 - bouncer 196
 - Coulomb force 194
 - environment 174, 197
 - floor 194
 - gravity 180
 - magnetic field 185
 - mass 56, 175
 - rubber band 187
 - spring 189
 - starting a 173
 - sun 56, 183
 - velocity 56, 178
- simulation 394
- simulationtime 390
- sin 251

size 158
 size (property) 237
 sketch recognition 423
 slope (property) 237
 slots 227
 snap 117
 sort 261, 270, 271
 sound 376, 377
 spacing 316
 speed (property) 237, 239
 spherical geometry 8, 93, 114, 116
 spring 170, 189, 205
 sqrt 251
 star polygon 112
 stopanimation 391
 stopsound 380
 stoptone 367
 strength (property) 183, 185, 187, 194,
 201, 239
 strings 257, 261
 student exercise 7, 433–437
 sub 250
 submatrix 276
 subscript 314
 substring 258
 sum 273
 sun 56, 183
 sunflower 58, 408
 superscript 314
 swarm simulation 412
 symbols 321

T

tables 311
 take 264
 tan 251
 tangent 91, 110
 tangent 356
 TCP 387
 tension 170
 TeX 98, 313–322
 text 71, 97, 309
 text 258
 text (property) 237
 textcolor 283
 textsize 282
 three-bar linkage 51
 time 389
 timing 19
 tokenize 259
 tool 392
 touch-local 439
 touchscreen 438
 trace 160
 trace (property) 236
 tracelength (property) 236
 tracer 103
 transformation 10, 122, 352

affine 131, 327, 353
 applying a 123
 by function 135
 composition of 134
 defining a 123
 inverse of 133
 Möbius 132
 mapping 135
 projective 131, 211, 328, 353
 reflection 128, 353
 rotation 127, 327
 selecting a 123
 similarity 128, 353
 translation 125, 353
 transformation group 10, 144, 145
 translate 117
 translate 340
 translation 125, 353
 transpose 275
 triangular mesh 117
 trigger 244
 trigonometry 251
 triples 269
 two-body movement 193
 type 256, 351
 typesetting
 arrows 320
 binomial coefficient 316
 color 319
 fonts 311
 formula 314
 fraction 316
 greek 320
 matrix 317
 symbols 321
 tables 311
 text 309
 unicode 322
 vector 317
 whitespace 316
 typing 222

U

underline 317
 undo 43
 unicode 322
 unicode 311
 update 25
 use 429

V

v (property) 178, 238
 variable 222, 230
 variables 246
 vector 224, 272, 276
 typesetting 317
 vector field 301
 velocity 56, 167, 178

view 116, 163
 construction text 121
 euclidean 117
 hyperbolic 119
 polar 120
 spherical 48, 118
visible (property) 236
vx (property) 178, 238
vy (property) 178, 238

W

wait 390
waves 377
while 244
whiteboard 423
winding number 96

X

x (property) 237
xdamp (property) 196, 197, 239
xor 255
xy (property) 237

Y

y (property) 237
ydamp (property) 196, 197, 239

Z

zeromatrix 276
zeros 358
zerovector 276
zoom 117

References

1. Bell, E.T.: Men of Mathematics. Touchstone Books, New York (1986 (orig. 1945))
2. Bell, E.T.: The Development of Mathematics. Dover Publishing, New York (1992 (orig. 1945))
3. Coxeter, H.S.M.: The Real Projective Plane, 3rd edn. Springer, New York, Berlin (1992 (orig. 1949))
4. Coxeter, H.S.M.: Projective Geometry, 2nd edn. Springer, New York, Berlin (1994 (orig. 1963))
5. Crapo, H., Richter-Gebert, J.: Automatic proving of geometric theorems. In: N. White (ed.) Invariant Methods in Discrete and Computational Geometry. Kluwer Academic Publishers (1995)
6. Fest, A., Kortenkamp, U.: Teaching graph algorithms with visage. Teaching Mathematics and Computer Science **7**(1), 35–50 (2009). URL <http://tmcs.math.klte.hu/Contents/2009-Vol-VII-Issue-I.html>
7. Geschke, A., Kortenkamp, U., Lutz-Westphal, B., Materlik, D.: Visage – visualization of algorithms in discrete mathematics. Zentralblatt für Didaktik der Mathematik **37**(5), 395–401 (2005)
8. Greenberg, M.J.: Euclidean and non-Euclidean Geometries. Freeman and Company, New York (1996 (orig. 1974))
9. Kaltenbrunner, M., Bovermann, T., Bencina, R., Costanza, E.: Tuio: A protocol for table-top tangible user interfaces. In: Proceedings of the 6th International Workshop on Gesture in Human-Computer Interaction and Simulation (GW 2005) (2005). URL http://modin.yuri.at/publications/tuio_gw2005.pdf
10. Klein, F.: Vorlesungen über nicht-euklidische Geometrie. Springer, Berlin (1968 (orig. 1928))
11. Klein, F.: Development of Mathematics in the 19th Century. Math. Sci. Press (1979 (orig. 1928))
12. Knuth, D.E.: The TeXbook. Computers & typesetting. Addison-Wesley (1993)
13. Kortenkamp, U.: Foundations of Dynamic Geometry. Dissertation, ETH Zürich, Institut für Theoretische Informatik, Zürich (1999). URL <http://kortenkamps.net/papers/1999/diss.pdf>
14. Kortenkamp, U.: The future of mathematical software. In: Proceedings of MTCM 2000. Springer-Verlag (2001). URL <http://kortenkamps.net/papers/2001/future.pdf>
15. Kortenkamp, U.: Making the move: The next version of Cinderella. In: A.M. Cohen, X.S. Gao, N. Takayama (eds.) Proceedings of the First International Congress of Mathematical Software, pp. 208–216. World Scientific (2002). URL <http://www.cs.uleth.ca/~wismath/cccg/papers/ulrich.pdf>. A slightly modified version appeared in the proceedings of CCCG 02.
16. Kortenkamp, U.: Combining CAS and DGS – Towards Algorithmic Thinking. In: S. Li, D. Wang, J.Z. Zhang (eds.) Symbolic Computation and Education, pp. 150–173. World Scientific (2007)
17. Kortenkamp, U., Dohrmann, C.: User interface design for Dynamic Geometry software. Acta Didactica Napocensia **3**(2), 59–66 (2010). URL http://dppd.ubbcluj.ro/adn/article_3_2_6.pdf
18. Kortenkamp, U., Fest, A.: From CAS/DGS integration to algorithms in educational math software. In: Proceedings of ATCM 08 (2008)

19. Kortenkamp, U., Materlik, D.: Pen-based input of geometric constructions. In: P. Libbrecht (ed.) Proceedings of MathUI 2004 (2004). URL <http://kortenkamps.net/papers/2004/Scribbling-article.pdf>
20. Kortenkamp, U., Richter-Gebert, J.: Decision complexity in Dynamic Geometry. In: D. Wang (ed.) Proceedings of ADG 2000, no. 2061 in Lecture Notes in Artificial Intelligence, pp. 167–172. Springer-Verlag, Heidelberg (2001). URL http://kortenkamps.net/papers/2001/36_DecisionComplexity.pdf
21. Kortenkamp, U., Richter-Gebert, J.: Blended experimentation with DGS. In: Proceedings of CADGME 2009 (2009)
22. Kortenkamp, U.H., Richter-Gebert, J.: Geometry and education in the Internet age. In: T. Ottmann, I. Tomek (eds.) Ed-Media & Ed-Telecom 98. Proceedings of the Tenth World Conference on Educational Multimedia and Hypermedia & World Conference on Educational Telecommunications, Freiburg, Germany, June 20-25, 1998. AACE, Charlottesville (1998). URL <http://www.cinderella.de/papers/geo-i.pdf.gz>
23. Kortenkamp, U.H., Richter-Gebert, J.: Dynamic Geometry II: Applications. In: Abstracts 15th European Workshop Comput. Geom., pp. 109–111. INRIA Sophia-Antipolis (1999). URL <http://cinderella.de/papers/antibes-2.pdf>
24. Laborde, J.M.: Exploring non-Euclidean geometry in a dynamic geometry environment like Cabri-Géomètre. In: J. King, D. Schattschneider (eds.) Geometry Turned On, pp. 185–191. MAA (1997)
25. Richter-Gebert, J.: Mechanical theorem proving in projective geometry. *Annals of Mathematics and Artificial Intelligence* **13**, 139–172 (1995)
26. Richter-Gebert, J.: Perspectives on Projective Geometry. Springer-Verlag (2011)
27. Richter-Gebert, J., Kortenkamp, U.: Dynamic aspects in computational geometry. In: A. Montes (ed.) Proceedings of the EACA 2000, pp. 51–61. Barcelona (2000)
28. Richter-Gebert, J., Kortenkamp, U.: A dynamic setup for elementary geometry. In: Proceedings of MTCM 2000. Springer-Verlag (2001). URL http://kortenkamps.net/papers/2001/35_DynamicSetup.pdf
29. Richter-Gebert, J., Kortenkamp, U.: The power of scripting: DGS meets programming. *Acta Didactica Napocensia* **3**(2), 67–78 (2010). URL http://dppd.ubbcluj.ro/adn/article_3_2_7.pdf
30. Richter-Gebert, J., Kortenkamp, U.H.: Dynamic Geometry I: The problem of continuity. In: Abstracts 15th European Workshop Comput. Geom., pp. 51–53. INRIA Sophia-Antipolis (1999). URL <http://www.cinderella.de/papers/antibes-1.pdf>
31. Richter-Gebert, J., Kortenkamp, U.H.: Complexity issues in Dynamic Geometry. In: F. Cucker, J.M. Rojas (eds.) Foundations of Computational Mathematics (Proceedings of the Smale Fest 2000). World Scientific (2002). Also available as technical report TRB-2000/22, Freie Universität Berlin
32. Richter-Gebert, J., Orendt, T.: Geometriekalküle. Springer-Verlag (2009)
33. Struik, D.J.: A Concise History of Mathematics. Dover Publishing (1987)
34. Yaglom, I.M.: Felix Klein and Sophus Lie – Evolution of the Idea of Symmetry in the Nineteenth Century. Birkhäuser, Boston, Basel (1988)