ΠΕΙΡΑΜΑΤΙΚΗ ΜΕΛΕΤΗ ΤΩΝ INSTANCES ΓΙΑ ΤΗΝ ΕΡΓΑΣΙΑ :
Ανάπτυξη Λογισμικού για Δύσκολα Αλγοριθμικά Προβλήματα, Προσαρμοστική Επιλογή Μεθόδων και Τυχαιοποιημένη Επίλυση Αδιεξόδων για Μη Αμβλυγώνιες Τριγωνοποιήσεις Επίπεδων Γράφων Ευθύγραμμων Τμημάτων (PSLG)

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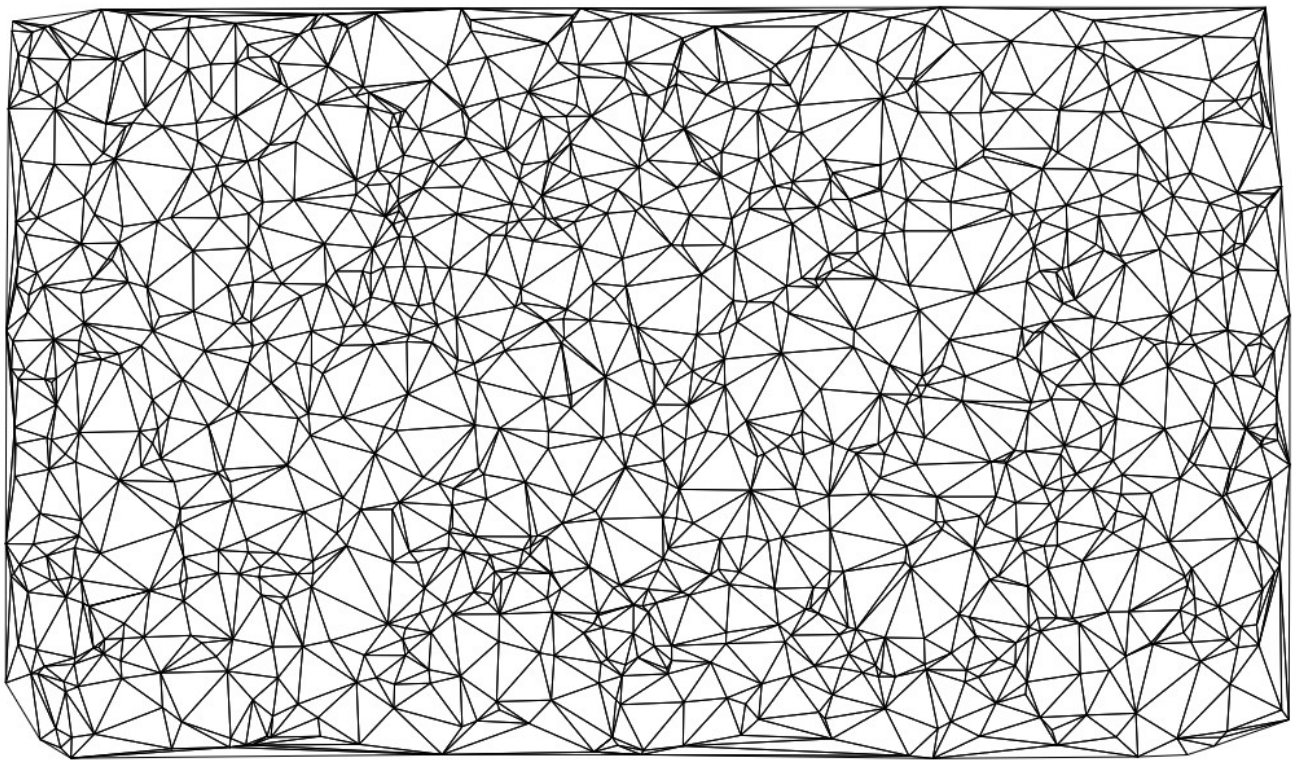


Στις ακόλουθες σελίδες παρουσιάζονται οι πίνακες και τα γραφήματα από την πειραματική μελέτη, ανα κατηγορία. Η μελέτη έγινε στα instances που δίνονται στο e-class. Τα αποτελέσματα για τα instances του διαγωνισμού βρίσκονται στα αντίστοιχα .json αρχεία εξόδου στον κώδικα.

Από την πειραματική μελέτη, καταλήγουμε στο συμπέρασμα ότι οι καλύτεροι αλγόριθμοι είναι ο Local Search για εισόδους κατηγορίας A, και ο Simulated Annealing για εισόδους κατηγορίας E και B. Η επιλογή randomization τις περισσότερες φορές χειροτερεύει τα αποτελέσματα. Επομένως, έγινε η επιλογή του κριτηρίου σύγκλισης για σύγκριση του ρυθμού p με το 0.1, ώστε να αποφεύγεται και να μελετηθούν πιο πιστά αποτελέσματα. Ο αλγόριθμος ant colony ήταν ο πιο αργός, και ο αλγόριθμος local search σε μερικά instances καθυστερούσε αρκετά. Για instances κατηγορίας A, οι παράμετροι του ant colony ήταν κυρίως με το βάρος στο A. Ο ant colony δεν ήταν τόσο αποδοτικός, βάζοντας περιττά steiner points και σε πολλές περιπτώσεις χειροτερεύοντας το instance. Οι καλύτερες μέθοδοι steiner points ήταν αυτή της προβολής (projection) και προβολή με βαρύκεντρο (projection - centroid).
Στην επόμενη σελίδα ακολουθούν παρατηρήσεις για συγκεκριμένα πειράματα με τα instances.

Για κάποια instances έγιναν οι εξής παρατηρήσεις για να δικαιολογηθεί η επιλογή των “default” και καλύτερων παραμέτρων :

→ ΑΠΛΑ INSTANCES (φάκελος tests/tests)

- Instance 4 : Ο αλγόριθμος local ήταν πολύ αργός. Ο αλγόριθμος sa δεν πραγματοποίησε ουσιαστική βελτίωση στον αριθμό των αμβλείων γωνιών αλλά ήταν αυτός με τα λιγότερα steiner points. Ο αλγόριθμος ant, σε αυτό το instance καθώς και σε πολλά άλλα, δεν λειτούργησε αποδοτικά και αύξησε τον αριθμό των αμβλείων και με περιττές εισαγωγές steiner points
- Instance 5 : Με επιλογή randomization, το συγκεκριμένο instance χειροτέρεψε με την επιλογή sa, που οδήγησε σε αριθμό steiner points = 1, αριθμό obtuse = 21.
- Instance 7 : Έγινε δοκιμή του αλγορίθμου ant με L = 3000. Τα αποτελέσματα ήταν #obtuse=1, #steiner=4, p=-1.12.

→ ΠΙΟ ΣΥΝΘΕΤΑ INSTANCES (φάκελος tests/test_instances)

- Instance 1 : Έγινε δοκιμή του ant με άλλα βάρη όπως a=0.7, b=0.3. Δεν ήταν τόσο αποδοτικός όσο για μεγαλύτερα βάρη, βάζοντας 109 steiner points και με 7 αμβλείες γωνίες.
- Instance 3 : Ο αλγόριθμος local ήταν γρήγορος, ωστόσο άφηνε αμβλείες γωνίες. Έγινε δοκιμή του sa με a=2, b=5 : Τα αποτελέσματα ήταν p=0, obtuse=6, steiner=2 και t=611ms.
- Instance 7 : Έγιναν δοκιμές του sa για a=1 και b=3 : Τα αποτελέσματα ήταν obtuse=7, steiner=500. Με μεγαλύτερα βάρη, υπήρχε καλύτερη απόδοση του αλγορίθμου. Για a=1 και b=0.5, υπήρχαν 50 obtuse.
- Instance 8 : Τα βάρη που επικράτησαν ήταν αυτά που δίνονται, διότι με a=3 και b=7 ο αριθμός των αμβλείων έμενε ίδιος.
- Instance 9 : Στον αλγόριθμο sa, με μικρότερα a, b που δοκιμάστηκαν ο αριθμός των obtuse και των steiner points ήταν μεγαλύτερος (όπως 10 obtuse και 200 steiner).
- Instance 10 : Για δοκιμές στον αλγόριθμο ant με άνισα βάρη, υπήρχαν αποτελέσματα steiner=700, obtuse=9. Για δοκιμές στον αλγόριθμο sa, με διατήρηση του a αλλά αύξηση του b υπήρχαν περισσότερες αμβλείες (πχ, b = 7 → obtuse=6).
- Instance 11 : Έγινε δοκιμή στον αλγόριθμο sa για a=3, b=6 → αποτελέσματα ήταν obtuse=8, steiner=2. Έγινε δοκιμή στον αλγόριθμο ant για a=2, b=5 : αποτελέσματα ήταν steiner=1502, obtuse=13, p=0.001098, και πολύ χρόνο t=446050ms.
- Instance 15 : Για δοκιμές του αλγορίθμου sa με a=2, b=5 τα αποτελέσματα ήταν steiner=3, obtuse=5.
- Instance 16 : ια δοκιμές του αλγορίθμου sa με a=2, b=2 τα αποτελέσματα ήταν steiner=8, obtuse=1, p = -1.32805.

Instance 2 category A

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	2	0	1	10						
sa	0	2	7	1	10	2	5				
ant	0.0534	2	6	10	10	2	5	1	3	0.5	10

Instance 3 category A

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	4	0	4	10						
sa	0	4	3	1	30	1	5				
ant	-0.353	4	2	4	30	2	5	1	3	0.5	10

Instance 4 category B

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-3.3	10	9	52	10						
sa	0	10	10	1	100	3	7				
ant	0.003	10	12	150	30	10	30	2	5	0.8	5

Instance 5 category B

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0		6	69	100						
sa	0		10	1	100	2	5				
ant	0		10	1	50	2	10	1	0.3	0.8	20

Instance 6 category B

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	8	6	56	100						
sa	0	8	9	1	100	2	10				
ant	0.0534	8	7	301	100	2	7	3	5	0.8	30

Instance 7 category A

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	6	1	16	100						
sa	0	6	2	3	30	2	5				
ant	0.0534	6	2	450	50	2	5	1	3	0.8	10

Instance 1 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-2.2	8	0	14	10						
sa	-2	8	8	1	100	2	7				
ant	0.03	8	7	100	200	2	7	1.5	2	0.1	10

Instance 2 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-5.19	8	3	51	500						
sa	-0.6	8	3	5	500	2	5				
ant	8	8	9	2000	500	0.7	0.3	2	1.5	0.2	10

Instance 3 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	8	0	13	500						
sa	0	8	6	2	500	2	5				
ant	0.01	8	7	202	100	0.8	0.2	2	1	0.15	8

Instance 4 category A

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-2.84	2	1	8	100						
sa	0	2	1	1	100	1	3				
ant	0.011	2	3	50	50	1	0	1	1	0.2	5

Instance 5 category A

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	3	0	9	100						
sa	0	3	2	3	100	1	3				
ant	-1.38	3	1	1	50	1	3	1	1	0.2	10

Instance 6 category A

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local											
sa	0	4	3	1	150	2	5				
ant	0.004	4	6	300	100	1	0.3	1.2	0.8	0.3	10

Instance 7 category B

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	4	2	205	200						
sa	0	4	3	1	200	3	7				
ant	0.002	4	5	450	150	1	0.5	1.2	0.8	0.3	10

Instance 8 category B

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-1.07	5	1	6-60	100						
sa	-0.25	5	3	3	100	1	3				
ant	0.009	5	8	150	50	3	7	1	1	0.3	10

Instance 9 category A

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-1.37	7	6	34	200						
sa	-0.389	7	4	3	200	2	5				
ant	0	7	7	100	100	3	7	1	1	0.3	10

Instance 10 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-7.706	7	1	10	300						
sa	-0.503	7	3	4	300	3	4				
ant	0.0033	7	8	450	150	1	1	1	1	0.4	6

Instance 11 category B

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	10	9	30	400						
sa	-0.258	10	7	3	500	2	5				
ant	0.0008	10	16	2100	300	3	6	2	2	0.3	8

Instance 12 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	5	0		200						
sa	-1.43	5	0		300	2	3				
ant	0.007	5	4	203	200	2	5	1.5	2	0.2	6

Instance 13 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	9	7	92	300						
sa	0	9	8	2	400	2	5				
ant	0.000839	9	14	1800	300	1.5	2.5	2	3	0.3	10

Instance 14 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-9.995	8	1		300						
sa	-0.288	8	5	2	500	2	5				
ant	0.00140958	8	16	1.5	300	1.5	2	3	4	0.25	10

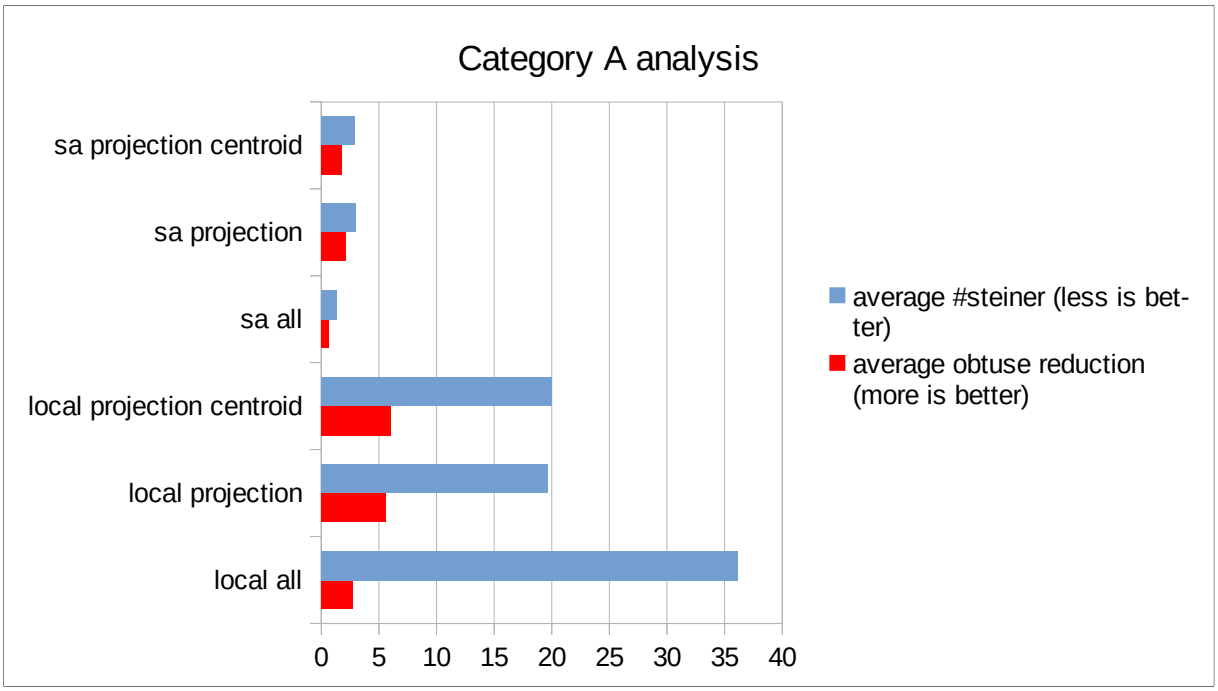
Instance 15 category E

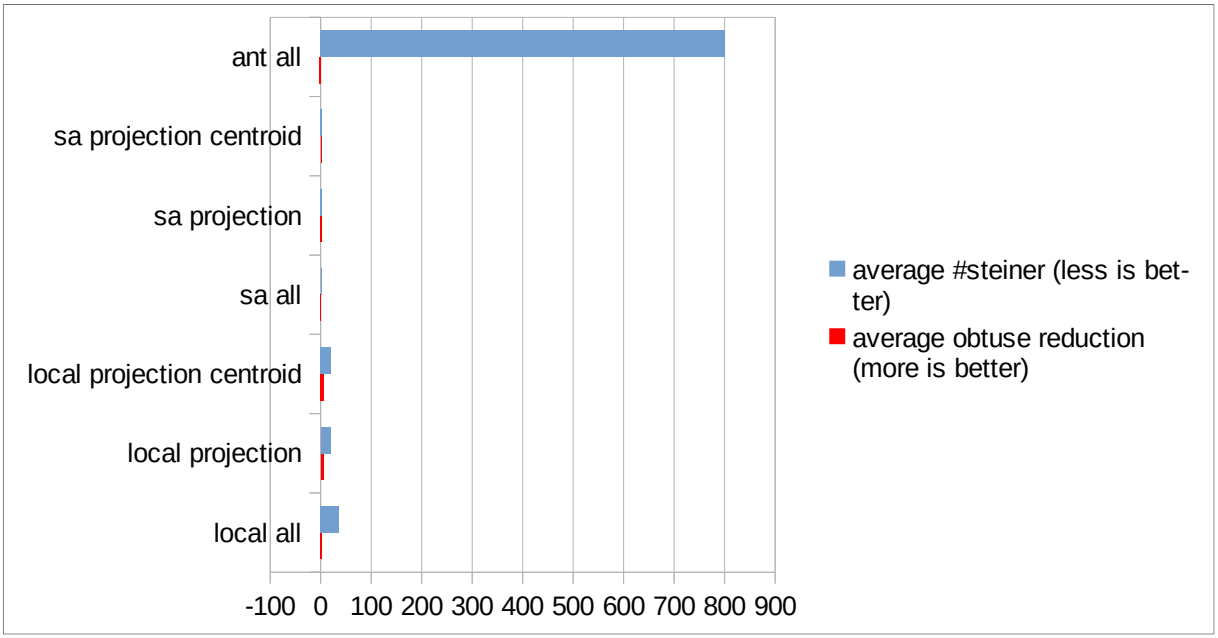
	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	0	8	1	14	500						
sa	-0.582	8	3	5	400	3	5				
ant	0.0012	8	13	1800	400	2	3	3	4	0.25	10

Instance 16 category E

	p	obtuse before	obtuse after	steiner points	L	a	b	x	y	λ	κ
local	-8.03	6	1	10	100						
sa	-0.14	6	4	3	100	2	4				
ant	0.013	6	9	800	130	2	3	3	2	0.25	8

	average obtuse reduction (more is better)	average #steiner (less is better)
local all	2.75	36.125
local projection	5.625	19.625
local projection centroid	6	20
sa all	0.625	1.375
sa projection	2.125	3
sa projection centroid	1.75	2.875
ant all	-2.125	800.125


Category A analysis
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
0
5
10
15
20
25
30
35
40
average #steiner (less is bet-ter)
average obtuse reduction (more is better)


ant all
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
-100
0
100
200
300
400
500
600
700
800
900
average #steiner (less is bet-ter)
average obtuse reduction (more is better)

local all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/point-set_10_4bcb7c21.instance.json	6	2	16	133975
competition/point-set_10_7451a2a9.instance.json	5	1	12	61936
competition/point-set_10_97578aae.instance.json	6	1	22	338974
competition/point-set_10_13860916.instance.json	11	0	23	210971
competition/point-set_10_ae0fff93.instance.json	6	2	17	154508
competition/point-set_10_c04b0024.instance.json	9	4	26	323629
competition/point-set_10_d009159f.instance.json	8	5	32	605429
competition/point-set_10_f999dc7f.instance.json	10	24	141	6970197

local projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/point-set_10_4bcb7c21.instance.json	6	2	11	5549
competition/point-set_10_7451a2a9.instance.json	5	1	12	5163
competition/point-set_10_97578aae.instance.json	6	5	31	45103
competition/point-set_10_13860916.instance.json	11	0	20	8209
competition/point-set_10_ae0fff93.instance.json	6	0	11	2716
competition/point-set_10_c04b0024.instance.json	9	1	17	7719
competition/point-set_10_d009159f.instance.json	8	5	37	98922
competition/point-set_10_f999dc7f.instance.json	10	2	18	11468

local projection centroid

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/point-set_10_4bcb7c21.instance.json	6	2	11	10001
competition/point-set_10_7451a2a9.instance.json	5	1	12	8645
competition/point-set_10_97578aae.instance.json	6	0	17	13437
competition/point-set_10_13860916.instance.json	11	3	37	224028
competition/point-set_10_ae0fff93.instance.json	6	0	12	7202
competition/point-set_10_c04b0024.instance.json	9	0	16	10340
competition/point-set_10_d009159f.instance.json	8	5	37	202930
competition/point-set_10_f999dc7f.instance.json	10	2	18	24262

sa all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/point-set_10_4bcb7c21.instance.json	6	6	1	135715
competition/point-set_10_7451a2a9.instance.json	5	5	1	56782
competition/point-set_10_97578aae.instance.json	6	6	1	147705
competition/point-set_10_13860916.instance.json	11	8	3	197396
competition/point-set_10_ae0fff93.instance.json	6	6	1	169211
competition/point-set_10_c04b0024.instance.json	9	7	2	208478
competition/point-set_10_d009159f.instance.json	8	8	1	156271
competition/point-set_10_f999dc7f.instance.json	10	10	1	162755

sa projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/point-set_10_4bcb7c21.instance.json	6	3	4	146544
competition/point-set_10_7451a2a9.instance.json	5	4	2	152053
competition/point-set_10_97578aae.instance.json	6	5	2	165650
competition/point-set_10_13860916.instance.json	11	7	4	240181
competition/point-set_10_ae0fff93.instance.json	6	5	2	72200
competition/point-set_10_c04b0024.instance.json	9	5	5	244666
competition/point-set_10_d009159f.instance.json	8	7	2	254928
competition/point-set_10_f999dc7f.instance.json	10	8	3	288618

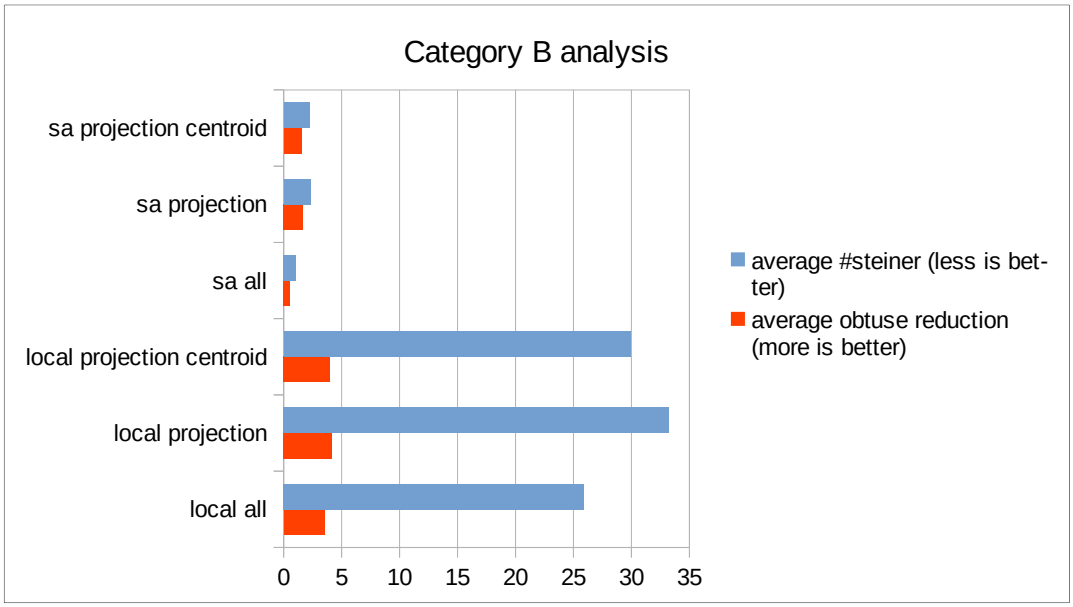
sa projection centroid

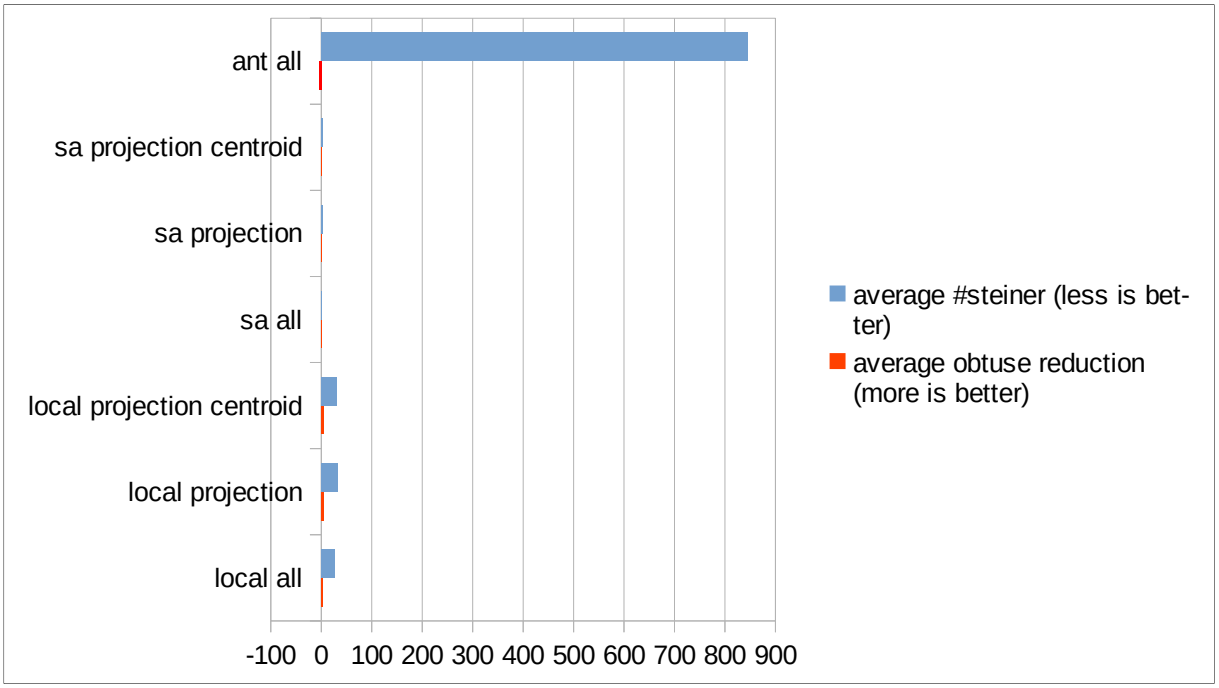
name	obtuse before	obtuse after	steiner points	execution time in ms
competition/point-set_10_4bcb7c21.instance.json	6	4	3	194193
competition/point-set_10_7451a2a9.instance.json	5	3	3	118207
competition/point-set_10_97578aae.instance.json	6	5	2	145653
competition/point-set_10_13860916.instance.json	11	7	5	314015
competition/point-set_10_ae0fff93.instance.json	6	6	1	192509
competition/point-set_10_c04b0024.instance.json	9	6	4	248675
competition/point-set_10_d009159f.instance.json	8	8	1	257081
competition/point-set_10_f999dc7f.instance.json	10	8	4	337854

ant all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/point-set_10_4bcb7c21.instance.json	6	9	600	18213995
competition/point-set_10_7451a2a9.instance.json	5	6	600	11075793
competition/point-set_10_97578aae.instance.json	6	4	401	6815618
competition/point-set_10_13860916.instance.json	11	16	800	29791740
competition/point-set_10_ae0fff93.instance.json	6	7	600	11838244
competition/point-set_10_c04b0024.instance.json	9	10	1200	28476807
competition/point-set_10_d009159f.instance.json	8	12	800	23408810
competition/point-set_10_f999dc7f.instance.json	10	14	1400	37600741

	average obtuse reduction (more is better)	average #steiner (less is better)
local all	3.53846153846154	25.9230769230769
local projection	4.15384615384615	33.2307692307692
local projection centroid	4	29.9230769230769
sa all	0.538461538461538	1.07692307692308
sa projection	1.69230769230769	2.30769230769231
sa projection centroid	1.53846153846154	2.23076923076923
ant all	-4.53846153846154	846.153846153846


Category B analysis
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
0
5
10
15
20
25
30
35
average #steiner (less is bet-ter)
average obtuse reduction (more is better)


ant all
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
-100
0
100
200
300
400
500
600
700
800
900
average #steiner (less is bet-ter)
average obtuse reduction (more is better)

local_all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior-20_10_6fbd9669.instance.json	6	2	18	190565
competition/simple-polygon-exterior-20_10_8c4306da.instance.json	8	4	24	448020
competition/simple-polygon-exterior-20_10_46c44a43.instance.json	8	4	19	250121
competition/simple-polygon-exterior-20_10_868921c7.instance.json	7	2	14	73788
competition/simple-polygon-exterior-20_10_15783346.instance.json	7	5	28	445531
competition/simple-polygon-exterior-20_10_c6728228.instance.json	8	2	22	433283
competition/simple-polygon-exterior-20_10_ce9152de.instance.json	9	5	28	564936
competition/simple-polygon-exterior_10_8b098f5e.instance.json	9	6	30	569749
competition/simple-polygon-exterior_10_310dc6c7.instance.json	5	1	8	27342
competition/simple-polygon-exterior_10_40642b31.instance.json	7	6	33	763725
competition/simple-polygon-exterior_10_74050e4d.instance.json	7	4	15	160344
competition/simple-polygon-exterior_10_a5f0f2fc.instance.json	7	1	17	115031
competition/simple-polygon-exterior_10_c5616894.instance.json	12	12	81	1431834

local projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior-20_10_6fbd9669.instance.json	6	0	11	4630
competition/simple-polygon-exterior-20_10_8c4306da.instance.json	8	3	78	250386
competition/simple-polygon-exterior-20_10_46c44a43.instance.json	8	3	19	24208
competition/simple-polygon-exterior-20_10_868921c7.instance.json	7	1	36	76851
competition/simple-polygon-exterior-20_10_15783346.instance.json	7	5	51	96245
competition/simple-polygon-exterior-20_10_c6728228.instance.json	8	2	32	47171
competition/simple-polygon-exterior-20_10_ce9152de.instance.json	9	7	28	59351
competition/simple-polygon-exterior_10_8b098f5e.instance.json	9	4	21	33538
competition/simple-polygon-exterior_10_310dc6c7.instance.json	5	2	20	20476
competition/simple-polygon-exterior_10_40642b31.instance.json	7	3	10	10721
competition/simple-polygon-exterior_10_74050e4d.instance.json	7	4	21	52098
competition/simple-polygon-exterior_10_a5f0f2fc.instance.json	7	1	17	14894
competition/simple-polygon-exterior_10_c5616894.instance.json	12	11	88	246169

local projection centroid

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior-20_10_6fbd9669.instance.json	6	0	11	7168
competition/simple-polygon-exterior-20_10_8c4306da.instance.json	8	4	64	320439
competition/simple-polygon-exterior-20_10_46c44a43.instance.json	8	4	19	57572
competition/simple-polygon-exterior-20_10_868921c7.instance.json	7	1	36	120560
competition/simple-polygon-exterior-20_10_15783346.instance.json	7	5	51	199584
competition/simple-polygon-exterior-20_10_c6728228.instance.json	8	2	33	133083
competition/simple-polygon-exterior-20_10_ce9152de.instance.json	9	7	30	152015
competition/simple-polygon-exterior_10_8b098f5e.instance.json	9	4	21	70274
competition/simple-polygon-exterior_10_310dc6c7.instance.json	5	1	6	5185
competition/simple-polygon-exterior_10_40642b31.instance.json	7	3	10	17740
competition/simple-polygon-exterior_10_74050e4d.instance.json	7	4	15	35978
competition/simple-polygon-exterior_10_a5f0f2fc.instance.json	7	1	17	36844
competition/simple-polygon-exterior_10_c5616894.instance.json	12	12	76	460476

sa all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior-20_10_6fbd9669.instance.json	6	5	1	123281
competition/simple-polygon-exterior-20_10_8c4306da.instance.json	8	8	1	206126
competition/simple-polygon-exterior-20_10_46c44a43.instance.json	8	8	1	219193
competition/simple-polygon-exterior-20_10_868921c7.instance.json	7	7	1	187536
competition/simple-polygon-exterior-20_10_15783346.instance.json	7	7	1	188840
competition/simple-polygon-exterior-20_10_c6728228.instance.json	8	5	2	143144
competition/simple-polygon-exterior-20_10_ce9152de.instance.json	9	9	1	230446
competition/simple-polygon-exterior_10_8b098f5e.instance.json	9	8	1	212692
competition/simple-polygon-exterior_10_310dc6c7.instance.json	5	4	1	110086
competition/simple-polygon-exterior_10_40642b31.instance.json	7	7	1	206000
competition/simple-polygon-exterior_10_74050e4d.instance.json	7	6	1	183077
competition/simple-polygon-exterior_10_a5f0f2fc.instance.json	7	7	1	200066
competition/simple-polygon-exterior_10_c5616894.instance.json	12	12	1	320425

sa projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior-20_10_6fbd9669.instance.json	6	3	3	129044
competition/simple-polygon-exterior-20_10_8c4306da.instance.json	8	7	2	248986
competition/simple-polygon-exterior-20_10_46c44a43.instance.json	8	8	1	246907
competition/simple-polygon-exterior-20_10_868921c7.instance.json	7	5	3	224195
competition/simple-polygon-exterior-20_10_15783346.instance.json	7	5	3	135386
competition/simple-polygon-exterior-20_10_c6728228.instance.json	8	5	3	220247
competition/simple-polygon-exterior-20_10_ce9152de.instance.json	9	7	3	261935
competition/simple-polygon-exterior_10_8b098f5e.instance.json	9	8	1	256419
competition/simple-polygon-exterior_10_310dc6c7.instance.json	5	3	2	108349
competition/simple-polygon-exterior_10_40642b31.instance.json	7	6	2	234606
competition/simple-polygon-exterior_10_74050e4d.instance.json	7	5	2	220331
competition/simple-polygon-exterior_10_a5f0f2fc.instance.json	7	5	3	236860
competition/simple-polygon-exterior_10_c5616894.instance.json	12	11	2	374092

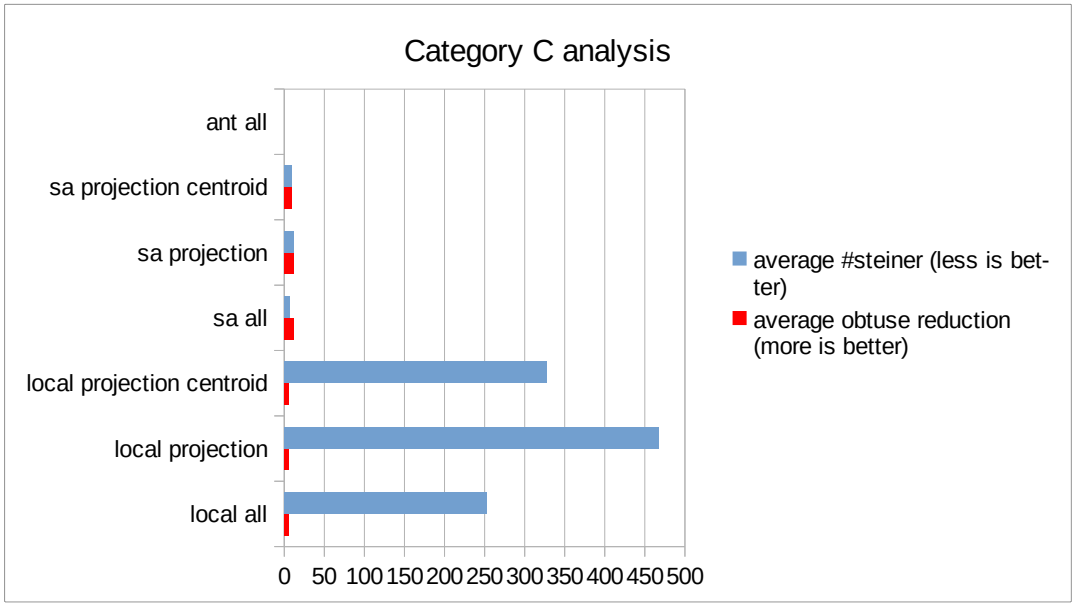
sa projection centroid

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior-20_10_6fbd9669.instance.json	6	4	2	145153
competition/simple-polygon-exterior-20_10_8c4306da.instance.json	8	6	3	241080
competition/simple-polygon-exterior-20_10_46c44a43.instance.json	8	7	2	251609
competition/simple-polygon-exterior-20_10_868921c7.instance.json	7	4	4	208226
competition/simple-polygon-exterior-20_10_15783346.instance.json	7	6	2	229253
competition/simple-polygon-exterior-20_10_c6728228.instance.json	8	6	2	167285
competition/simple-polygon-exterior-20_10_ce9152de.instance.json	9	8	2	286738
competition/simple-polygon-exterior_10_8b098f5e.instance.json	9	8	1	276519
competition/simple-polygon-exterior_10_310dc6c7.instance.json	5	4	1	146914
competition/simple-polygon-exterior_10_40642b31.instance.json	7	7	1	243293
competition/simple-polygon-exterior_10_74050e4d.instance.json	7	5	2	168394
competition/simple-polygon-exterior_10_a5f0f2fc.instance.json	7	5	3	245041
competition/simple-polygon-exterior_10_c5616894.instance.json	12	10	4	404105

ant all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior-20_10_6fbd9669.instance.json	6	12	600	18721342
competition/simple-polygon-exterior-20_10_8c4306da.instance.json	8	10	800	17438956
competition/simple-polygon-exterior-20_10_46c44a43.instance.json	8	9	600	14846230
competition/simple-polygon-exterior-20_10_868921c7.instance.json	7	10	600	14489308
competition/simple-polygon-exterior-20_10_15783346.instance.json	7	12	800	22052334
competition/simple-polygon-exterior-20_10_c6728228.instance.json	8	9	800	19382790
competition/simple-polygon-exterior-20_10_ce9152de.instance.json	9	20	1400	50297461
competition/simple-polygon-exterior_10_8b098f5e.instance.json	9	14	1200	35004341
competition/simple-polygon-exterior_10_310dc6c7.instance.json	5	7	600	11022186
competition/simple-polygon-exterior_10_40642b31.instance.json	7	9	600	13328983
competition/simple-polygon-exterior_10_74050e4d.instance.json	7	8	400	8548581
competition/simple-polygon-exterior_10_a5f0f2fc.instance.json	7	17	1000	31157115
competition/simple-polygon-exterior_10_c5616894.instance.json	12	22	1600	51751590

	average obtuse reduction (more is better)	average #steiner (less is better)
local all	5.5	253
local projection	6	467
local projection centroid	5.5	327.5
sa all	12	7.5
sa projection	11.5	11.5
sa projection centroid	9	9
ant all	DNF	DNF


Category C analysis
ant all
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
0
50
100
150
200
250
300
350
400
450
500
average #steiner (less is bet-ter)
average obtuse reduction (more is better)

local_all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior_40_ff947945.instance.json	49	41	246	20086256
competition/simple-polygon-exterior_60_8670ab75.instance.json	61	58	260	15541142

local projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior_40_ff947945.instance.json	49	41	241	3385989
competition/simple-polygon-exterior_60_8670ab75.instance.json	61	57	693	14431368

local projection centroid

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior_40_ff947945.instance.json	49	40	291	8211231
competition/simple-polygon-exterior_60_8670ab75.instance.json	61	59	364	10506640

sa all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior_40_ff947945.instance.json	49	38	7	2788161
competition/simple-polygon-exterior_60_8670ab75.instance.json	61	48	8	4633022

sa projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior_40_ff947945.instance.json	49	35	12	3684902
competition/simple-polygon-exterior_60_8670ab75.instance.json	61	52	11	5962165

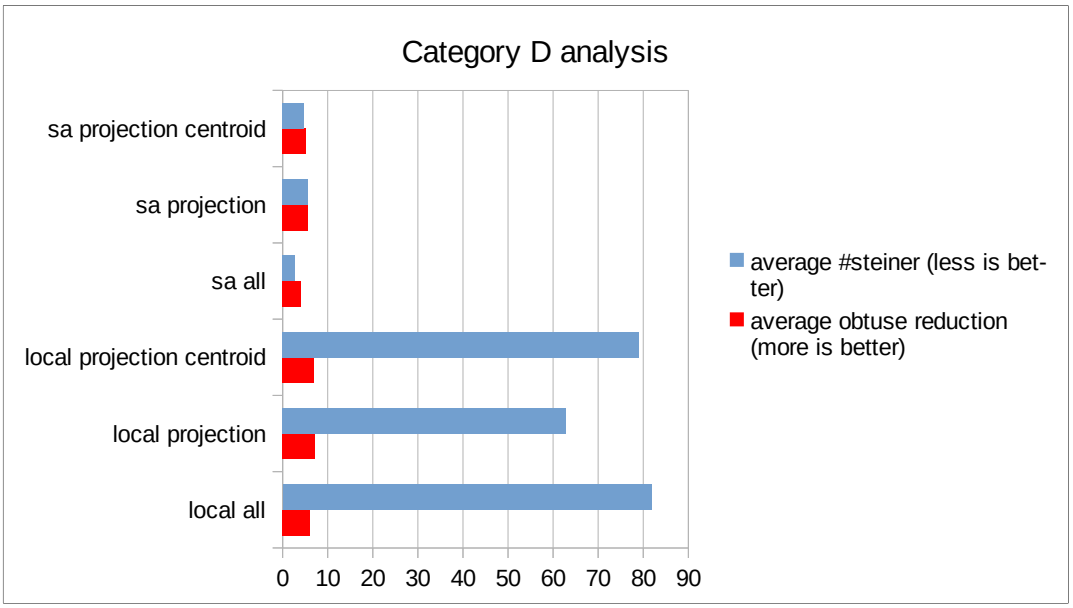
sa projection centroid

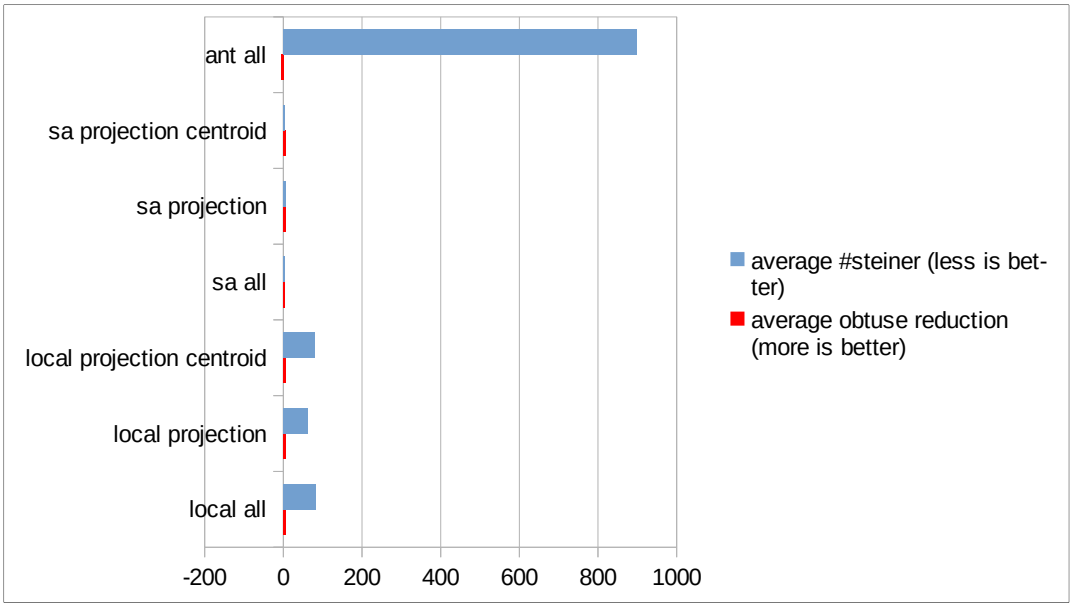
name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior_40_ff947945.instance.json	49	38	10	3754036
competition/simple-polygon-exterior_60_8670ab75.instance.json	61	54	8	6009913

ant all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon-exterior_40_ff947945.instance.json	49	DNF		
competition/simple-polygon-exterior_60_8670ab75.instance.json	61	DNF		

	average obtuse reduction (more is better)	average #steiner (less is better)
local all	6	81.8
local projection	7.2	62.8
local projection centroid	7	79
sa all	4	2.8
sa projection	5.6	5.6
sa projection centroid	5.2	4.8
ant all	-6	900


Category D analysis
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
0
10
20
30
40
50
60
70
80
90
average #steiner (less is bet-ter)
average obtuse reduction (more is better)


ant all
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
-200
0
200
400
600
800
1000
average #steiner (less is bet-ter)
average obtuse reduction (more is better)

local_all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/ortho_10_d2723dcc.instance.json	4	2	10	37604
competition/ortho_20_5a9e8244.instance.json	11	6	74	2771247
competition/ortho_20_e2aff192.instance.json	10	5	47	1252775
competition/ortho_40_56a6f463.instance.json	38	29	191	19293240
competition/ortho_40_df58ce3b.instance.json	24	15	87	5111728

local projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/ortho_10_d2723dcc.instance.json	4	2	10	1098
competition/ortho_20_5a9e8244.instance.json	11	3	21	12149
competition/ortho_20_e2aff192.instance.json	10	4	37	98339
competition/ortho_40_56a6f463.instance.json	38	27	164	2168635
competition/ortho_40_df58ce3b.instance.json	24	15	82	690207

local projection centroid

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/ortho_10_d2723dcc.instance.json	4	2	10	7160
competition/ortho_20_5a9e8244.instance.json	11	9	51	392347
competition/ortho_20_e2aff192.instance.json	10	2	32	95942
competition/ortho_40_56a6f463.instance.json	38	24	221	7810132
competition/ortho_40_df58ce3b.instance.json	24	15	81	1251090

sa all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/ortho_10_d2723dcc.instance.json	4	4	1	66821
competition/ortho_20_5a9e8244.instance.json	11	7	3	326294
competition/ortho_20_e2aff192.instance.json	10	7	3	362815
competition/ortho_40_56a6f463.instance.json	38	26	6	2045003
competition/ortho_40_df58ce3b.instance.json	24	23	1	1501255

sa projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/ortho_10_d2723dcc.instance.json	4	2	2	66646
competition/ortho_20_5a9e8244.instance.json	11	8	3	456074
competition/ortho_20_e2aff192.instance.json	10	10	1	515486
competition/ortho_40_56a6f463.instance.json	38	21	14	2681224
competition/ortho_40_df58ce3b.instance.json	24	18	8	1858199

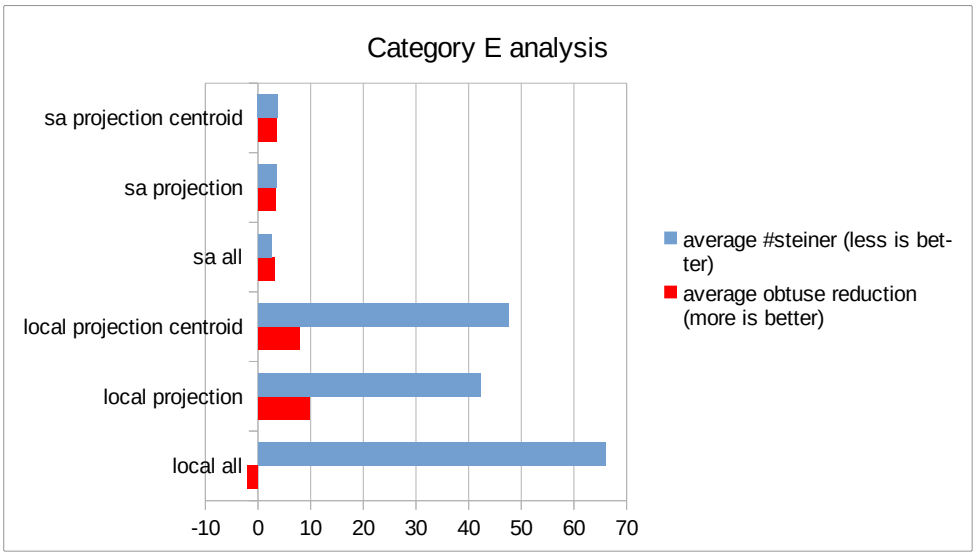
sa projection centroid

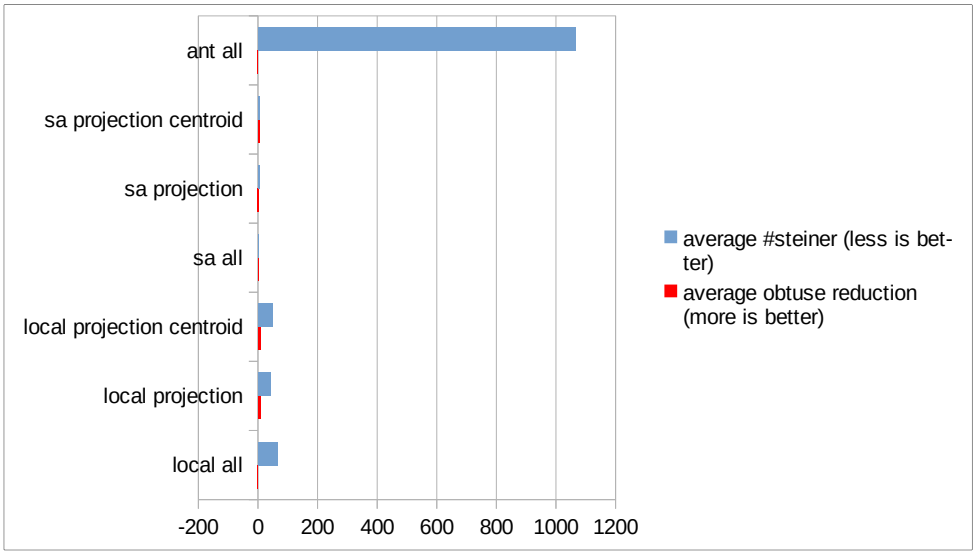
name	obtuse before	obtuse after	steiner points	execution time in ms
competition/ortho_10_d2723dcc.instance.json	4	2	2	49576
competition/ortho_20_5a9e8244.instance.json	11	8	4	486511
competition/ortho_20_e2aff192.instance.json	10	9	3	517543
competition/ortho_40_56a6f463.instance.json	38	22	11	2559810
competition/ortho_40_df58ce3b.instance.json	24	20	4	1782760

ant all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/ortho_10_d2723dcc.instance.json	4	6	400	8720696
competition/ortho_20_5a9e8244.instance.json	11	21	1400	56323996
competition/ortho_20_e2aff192.instance.json	10	DNF		
competition/ortho_40_56a6f463.instance.json	38	DNF		
competition/ortho_40_df58ce3b.instance.json	24	DNF		

	average obtuse reduction (more is better)	average #steiner (less is better)
local all	-2	66
local projection	9.8	42.2
local projection centroid	7.8	47.6
sa all	3.2	2.6
sa projection	3.4	3.6
sa projection centroid	3.6	3.8
ant all	-1.33333333333333	1066.33333333333


Category E analysis
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
-10
0
10
20
30
40
50
60
70
average #steiner (less is bet-ter)
average obtuse reduction (more is better)


ant all
sa projection centroid
sa projection
sa all
local projection centroid
local projection
local all
-200
0
200
400
600
800
1000
1200
average #steiner (less is bet-ter)
average obtuse reduction (more is better)

local_all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon_10_272aa6ea.instance.json	8	1	14	66637
competition/simple-polygon_10_297edd18.instance.json	10	1	25	362585
competition/simple-polygon_10_f2c8d74a.instance.json	9	5	33	299040
competition/simple-polygon_20_0dda68ed.instance.json	22	14	134	9746985
competition/simple-polygon_20_4bd3c2e5.instance.json	18	56	124	3012026

local projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon_10_272aa6ea.instance.json	8	1	14	6163
competition/simple-polygon_10_297edd18.instance.json	10	1	24	17720
competition/simple-polygon_10_f2c8d74a.instance.json	9	1	31	53831
competition/simple-polygon_20_0dda68ed.instance.json	22	8	65	322454
competition/simple-polygon_20_4bd3c2e5.instance.json	18	7	77	595632

local projection centroid

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon_10_272aa6ea.instance.json	8	1	14	9957
competition/simple-polygon_10_297edd18.instance.json	10	2	18	20561
competition/simple-polygon_10_f2c8d74a.instance.json	9	6	29	71855
competition/simple-polygon_20_0dda68ed.instance.json	22	14	111	1938422
competition/simple-polygon_20_4bd3c2e5.instance.json	18	5	66	462602

sa all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon_10_272aa6ea.instance.json	8	7	1	186538
competition/simple-polygon_10_297edd18.instance.json	10	9	2	200917
competition/simple-polygon_10_f2c8d74a.instance.json	9	7	2	193070
competition/simple-polygon_20_0dda68ed.instance.json	22	16	5	791388
competition/simple-polygon_20_4bd3c2e5.instance.json	18	12	3	577463

sa projection

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon_10_272aa6ea.instance.json	8	7	1	229526
competition/simple-polygon_10_297edd18.instance.json	10	8	3	272899
competition/simple-polygon_10_f2c8d74a.instance.json	9	7	2	231975
competition/simple-polygon_20_0dda68ed.instance.json	22	17	6	972597
competition/simple-polygon_20_4bd3c2e5.instance.json	18	11	6	675555

sa projection centroid

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon_10_272aa6ea.instance.json	8	6	2	105313
competition/simple-polygon_10_297edd18.instance.json	10	8	4	307072
competition/simple-polygon_10_f2c8d74a.instance.json	9	7	2	234402
competition/simple-polygon_20_0dda68ed.instance.json	22	14	6	945089
competition/simple-polygon_20_4bd3c2e5.instance.json	18	14	5	832787

ant all

name	obtuse before	obtuse after	steiner points	execution time in ms
competition/simple-polygon_10_272aa6ea.instance.json	8	11	800	19805262
competition/simple-polygon_10_297edd18.instance.json	10	11	1400	35392806
competition/simple-polygon_10_f2c8d74a.instance.json	9	9	999	25932470
competition/simple-polygon_20_0dda68ed.instance.json	22	DNF		
competition/simple-polygon_20_4bd3c2e5.instance.json	18	DNF		