

Master-Thesis

Methodical Approach for Analyzing Process Parameters and Optimizing Boundary Conditions in Multi-Axis Robot Programs

Status Update: Week 10 (13 weeks left)

11.12.2023 – 17.12.2023

Jan Nalivaika

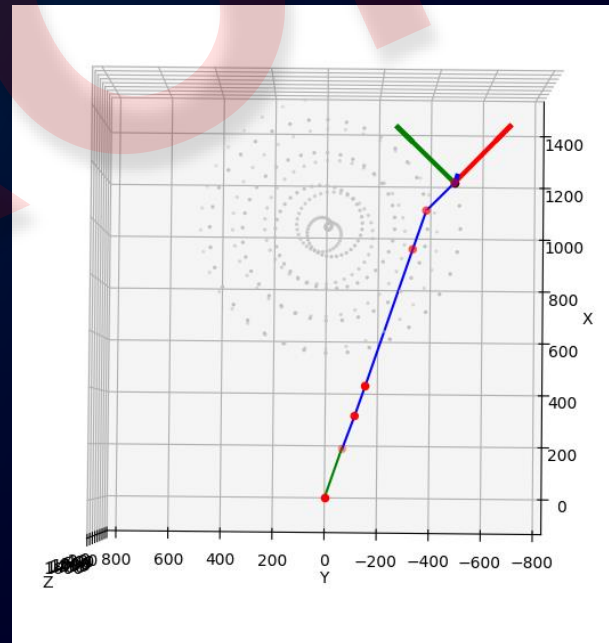
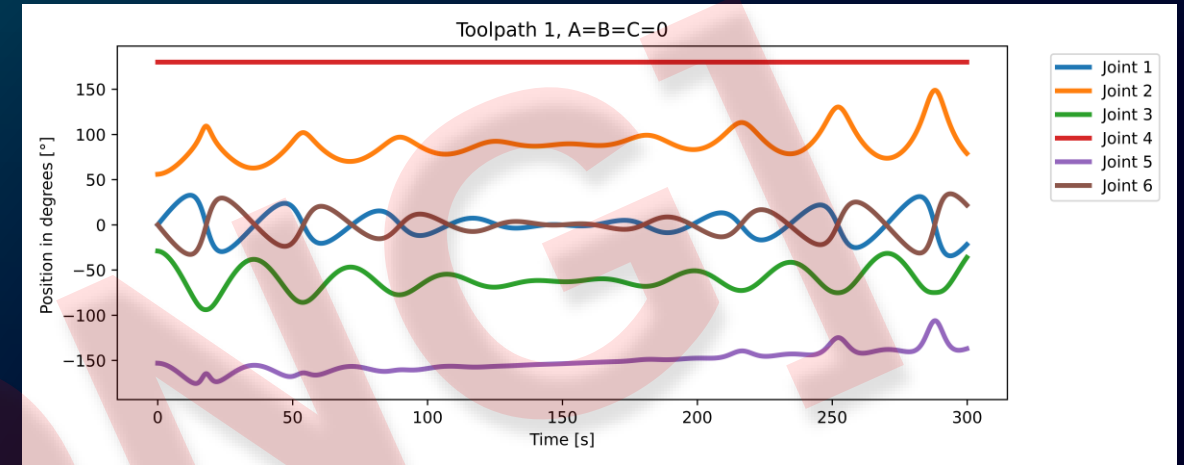
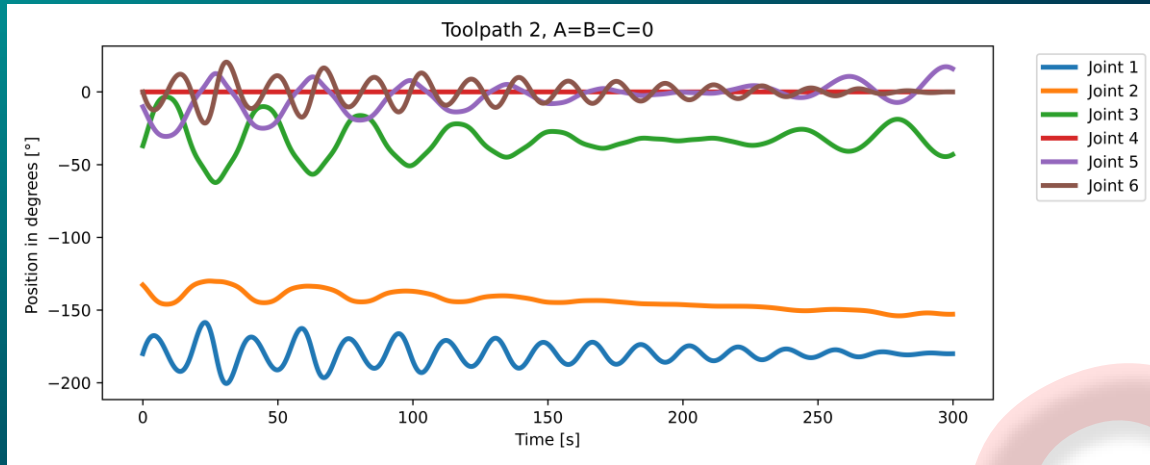
ToDo

- Swarm weiter testen = DONE
- Berechnung prüfen = DONE
- Größerer wertebereich = DONE
- Größere Werkzeugbahn = DONE

ERROR IN TITLE !!!!!!!!!!!

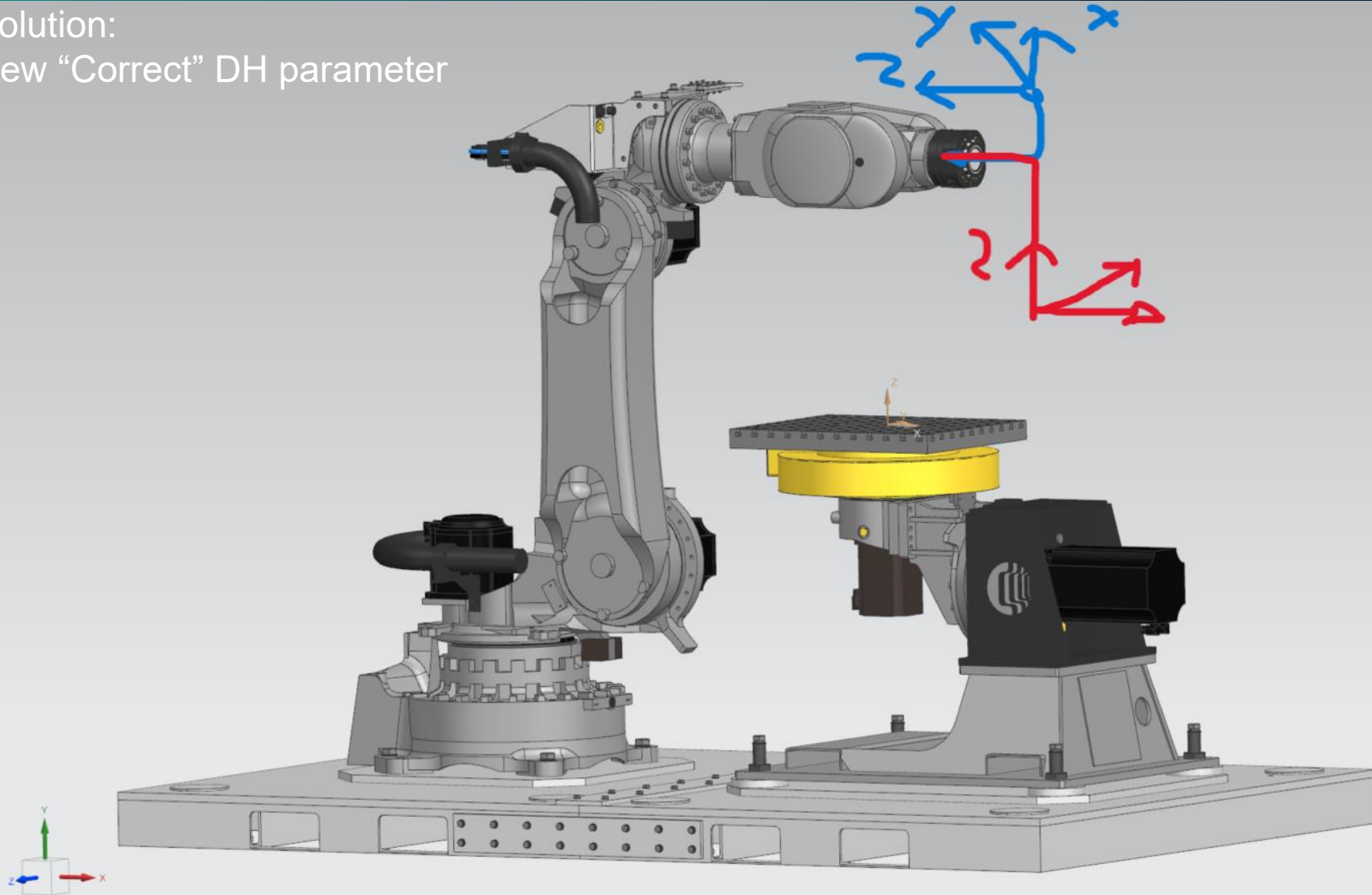
Email

Why 180:

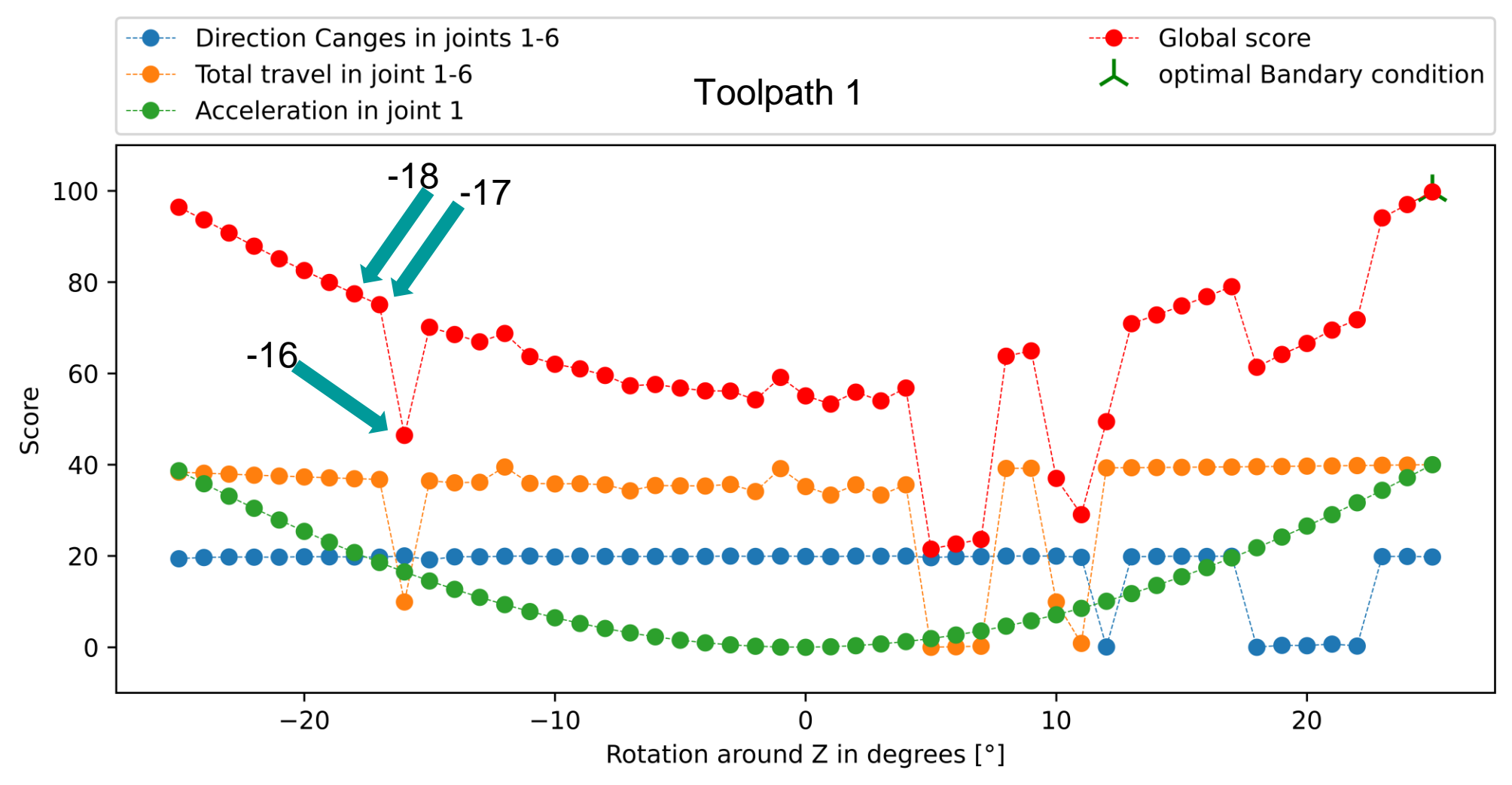


Always in line with joint 1

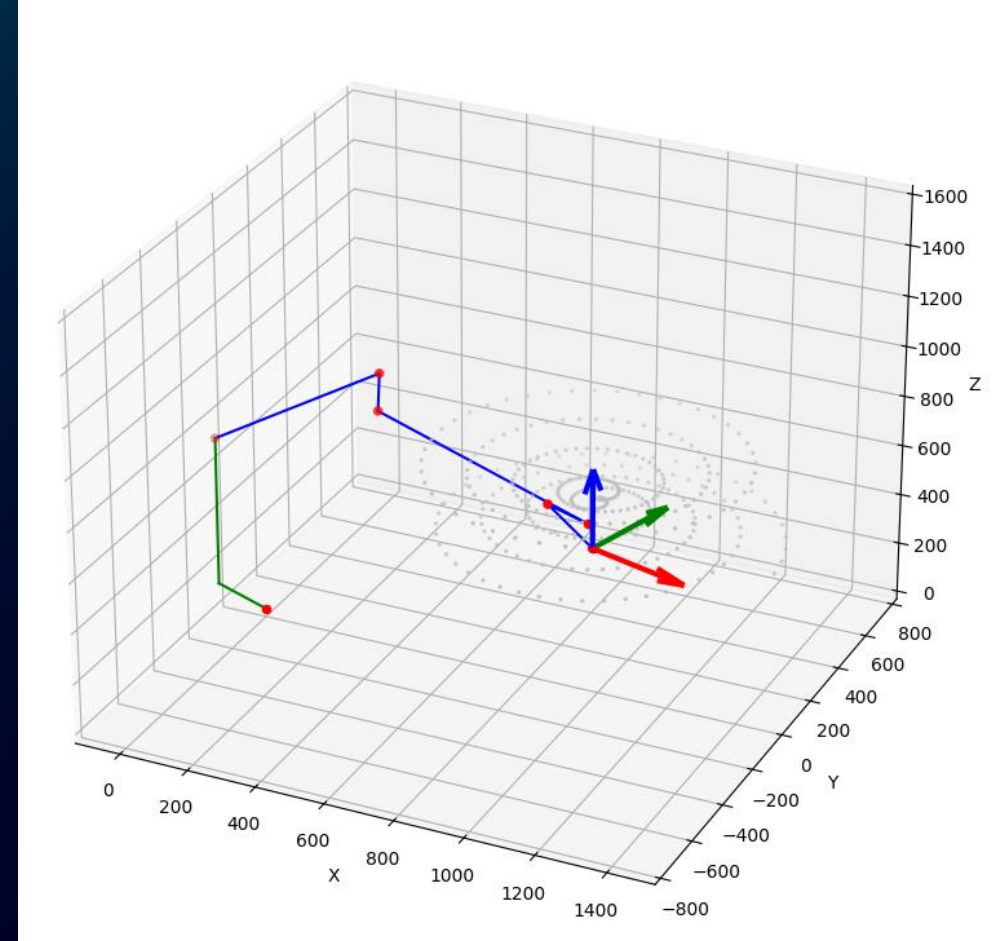
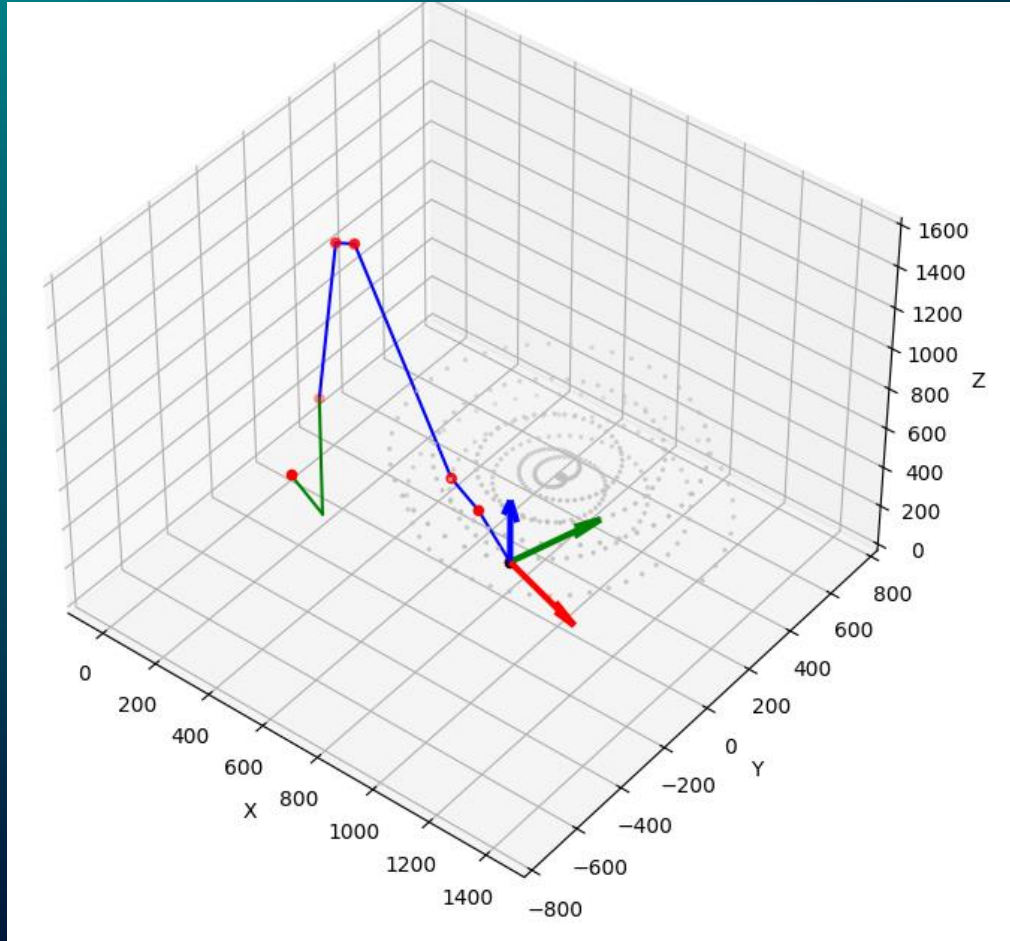
Solution:
New "Correct" DH parameter



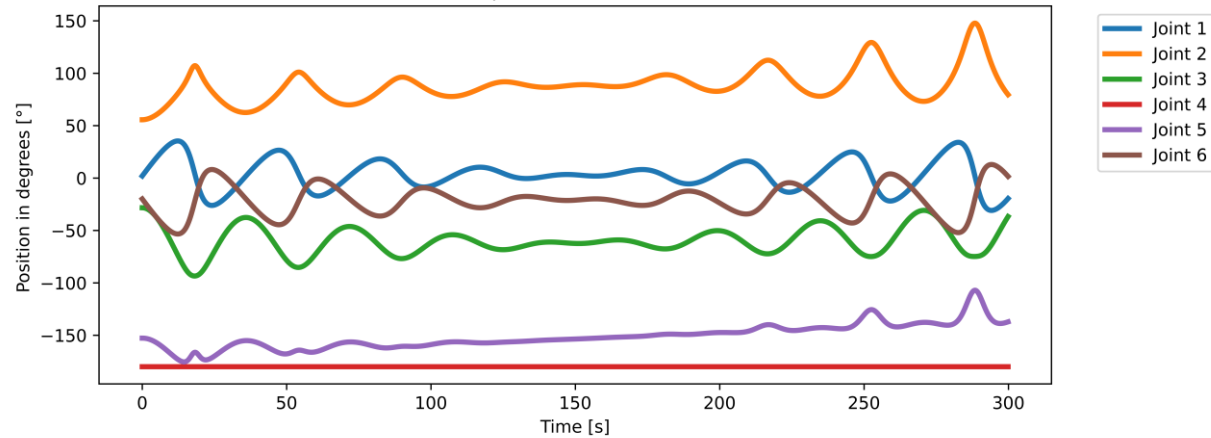
Why Jumping ???



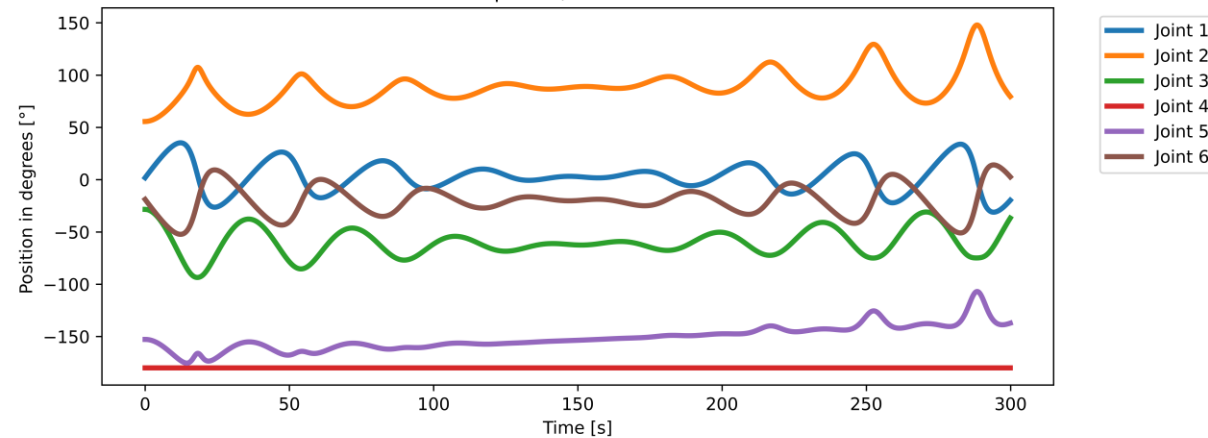
-17 vs -16



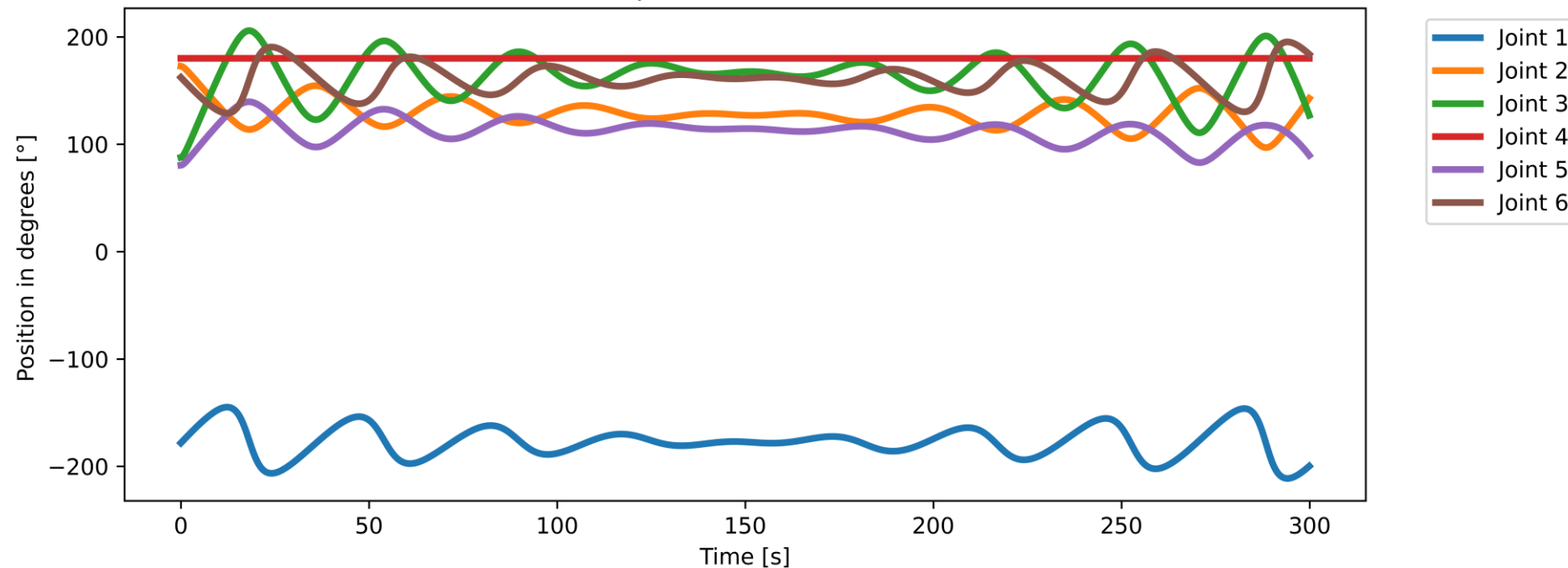
Toolpath 1, A=B=C=-18



Toolpath 1, A=B=C=-17



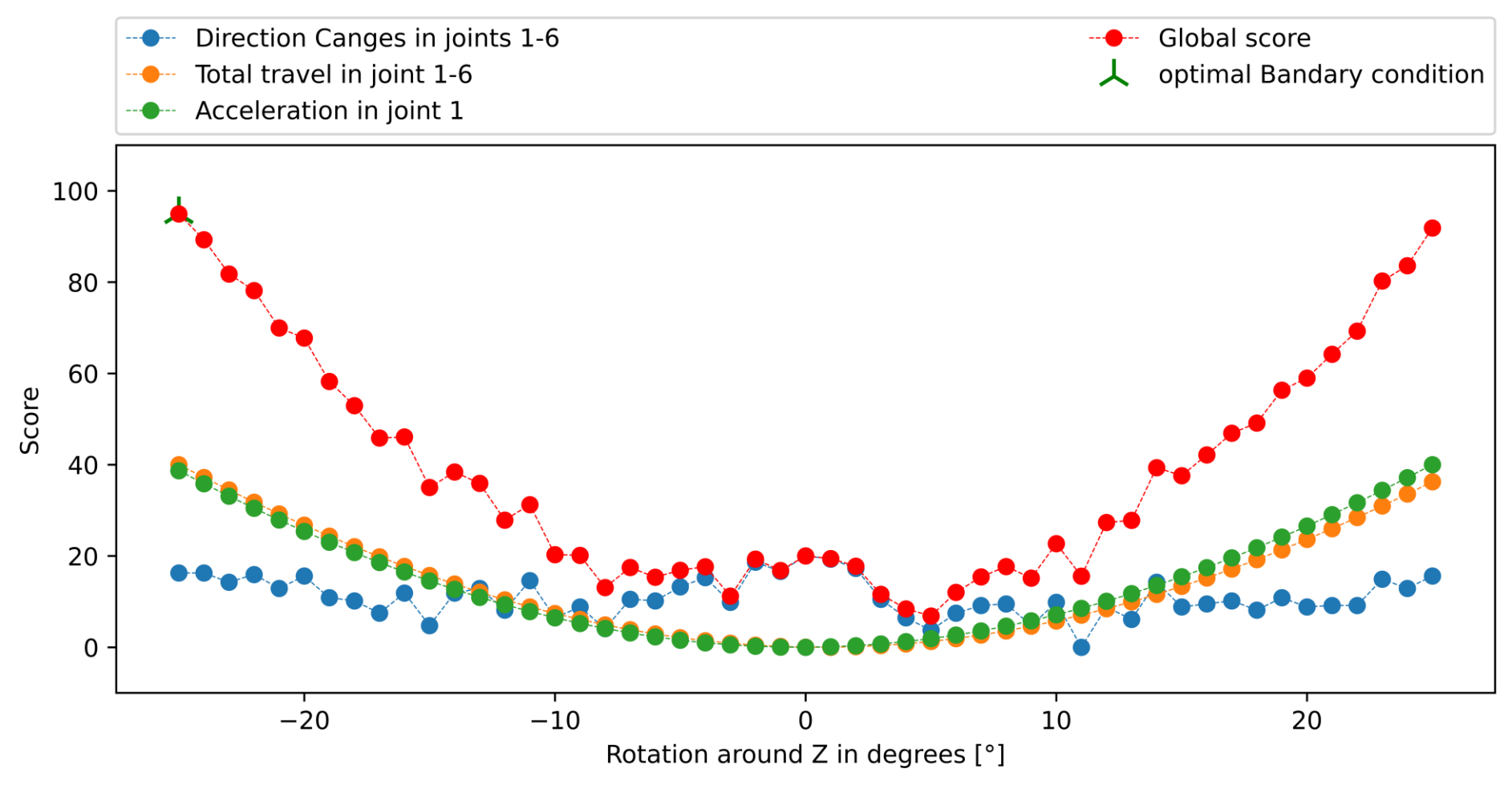
Toolpath 1, A=B=C=-16



Solution:

**Start inverse kinematics from
defined position**

Result



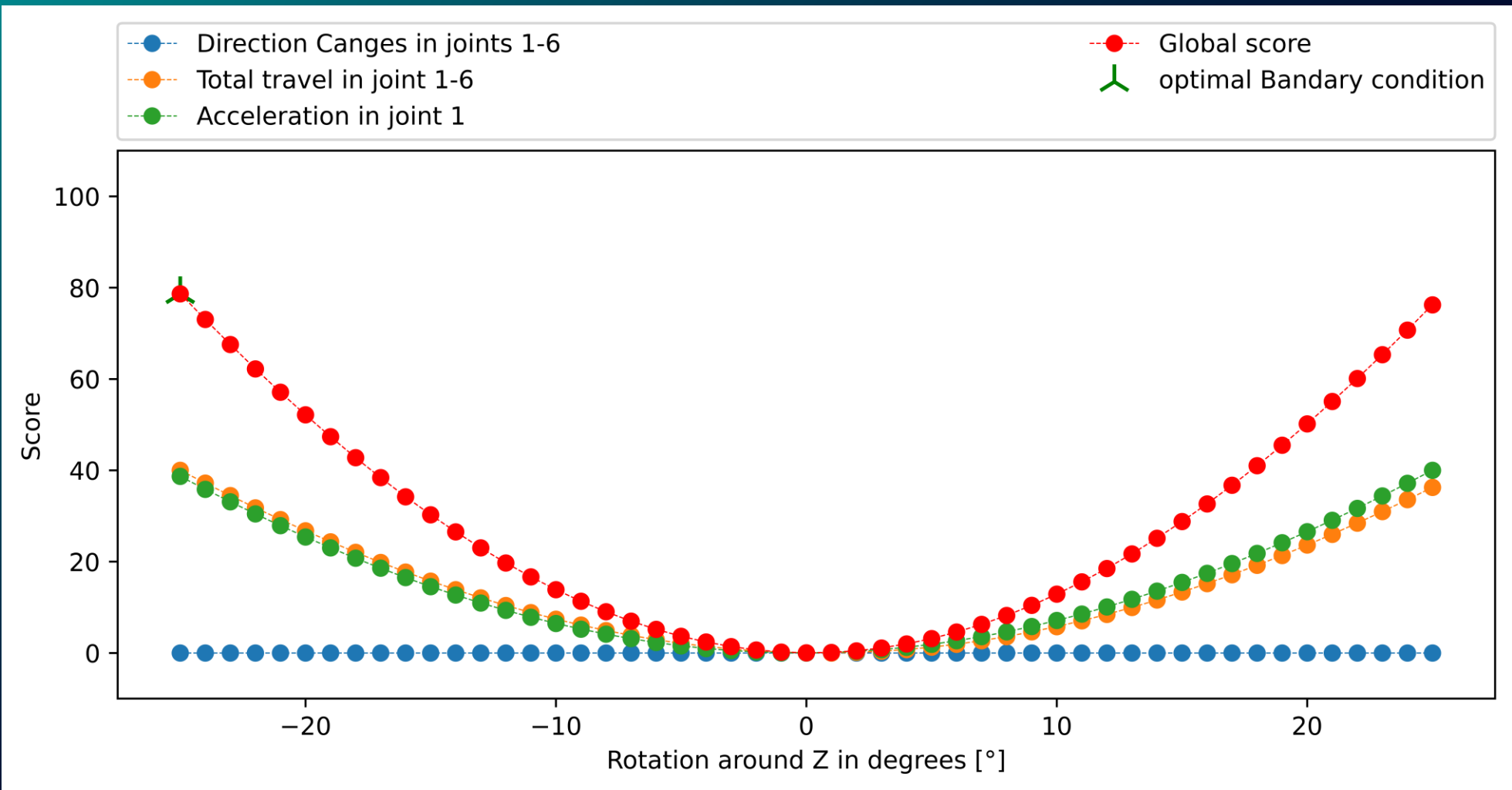
Cool!
But why direction
changes ??

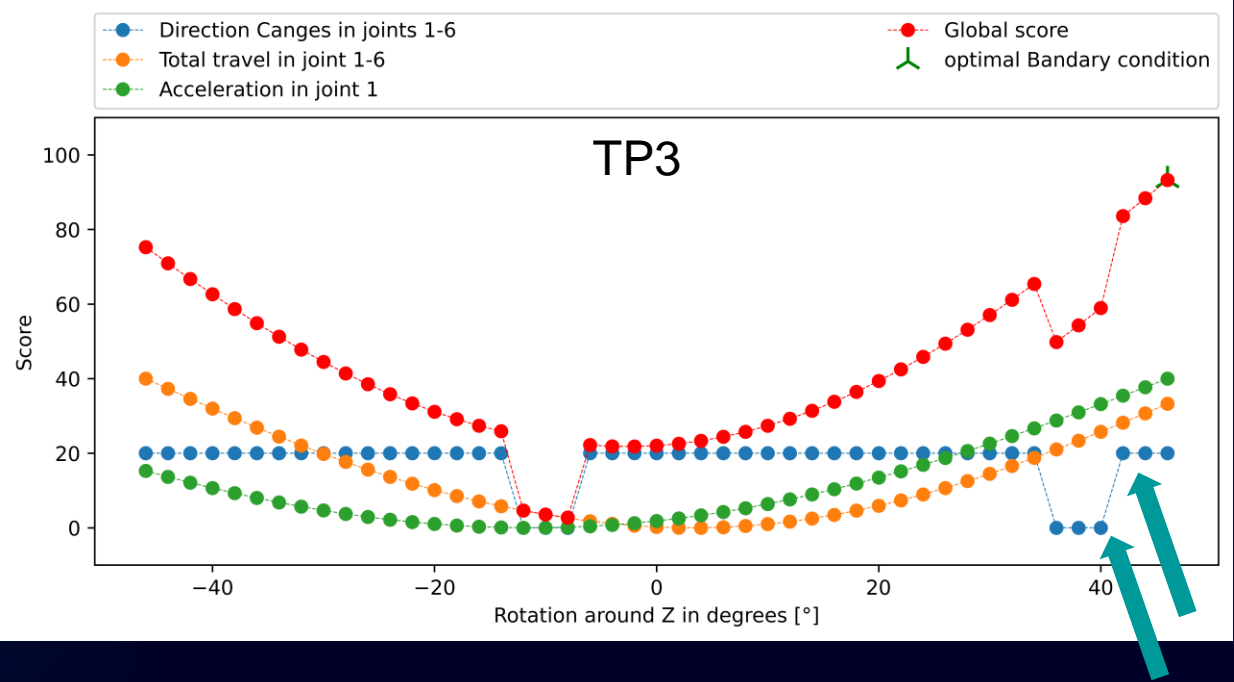
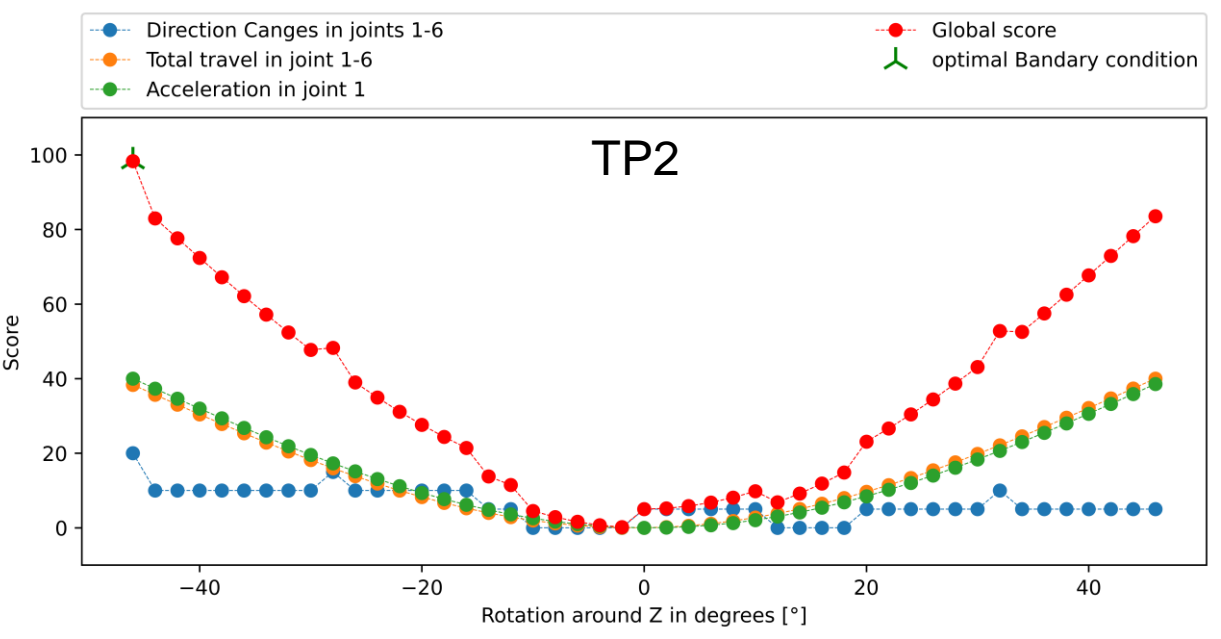
Because 180 is not
equal to 179.999999997!

Solution:
Added rounding to 3
decimals

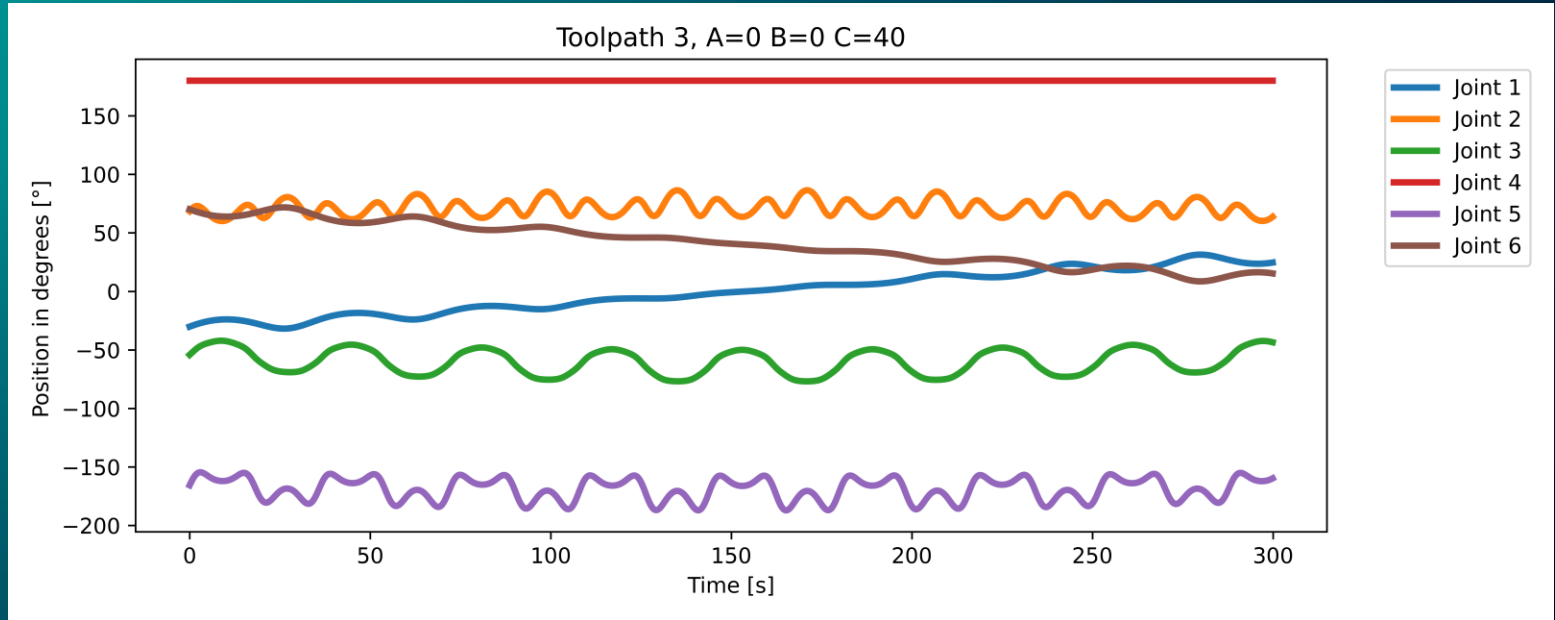


Solution !!!

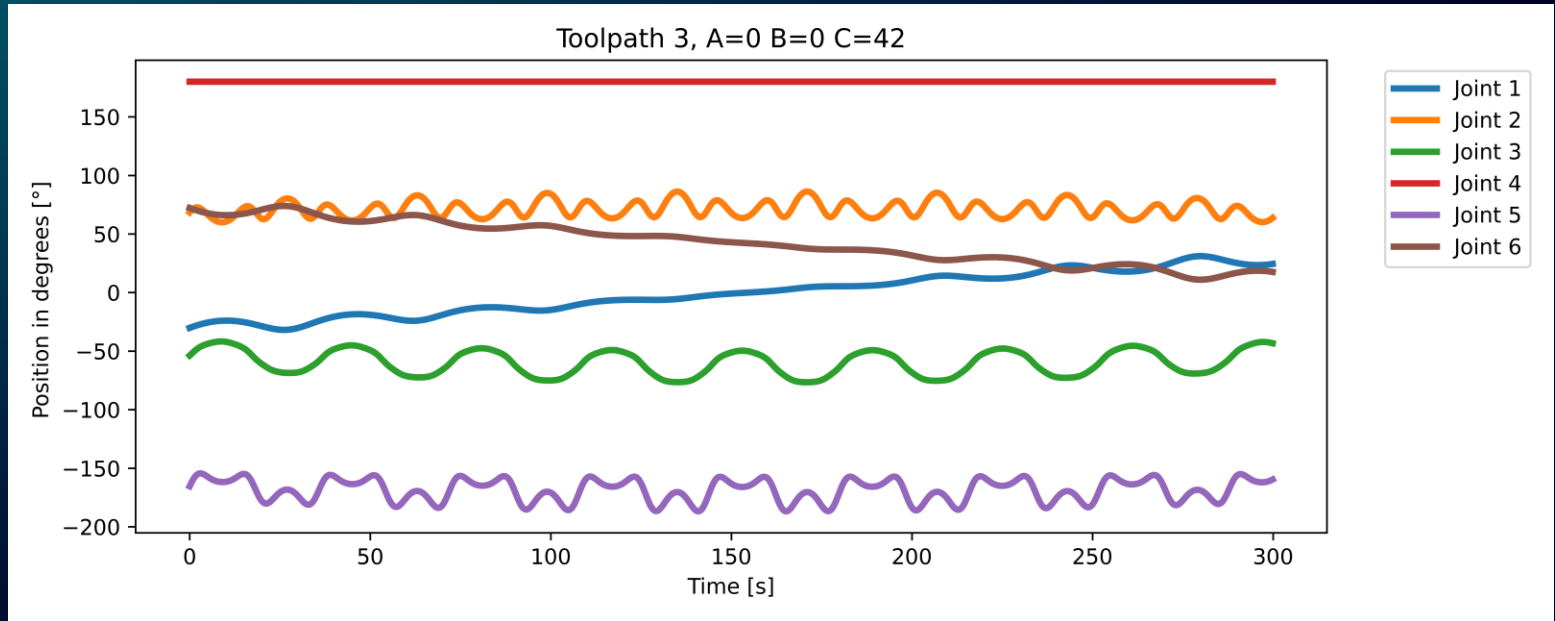




Why jumps in Direction changes ?????



Somehow there a 4 more
direction changes



Big OOF

All previous calculations are useless



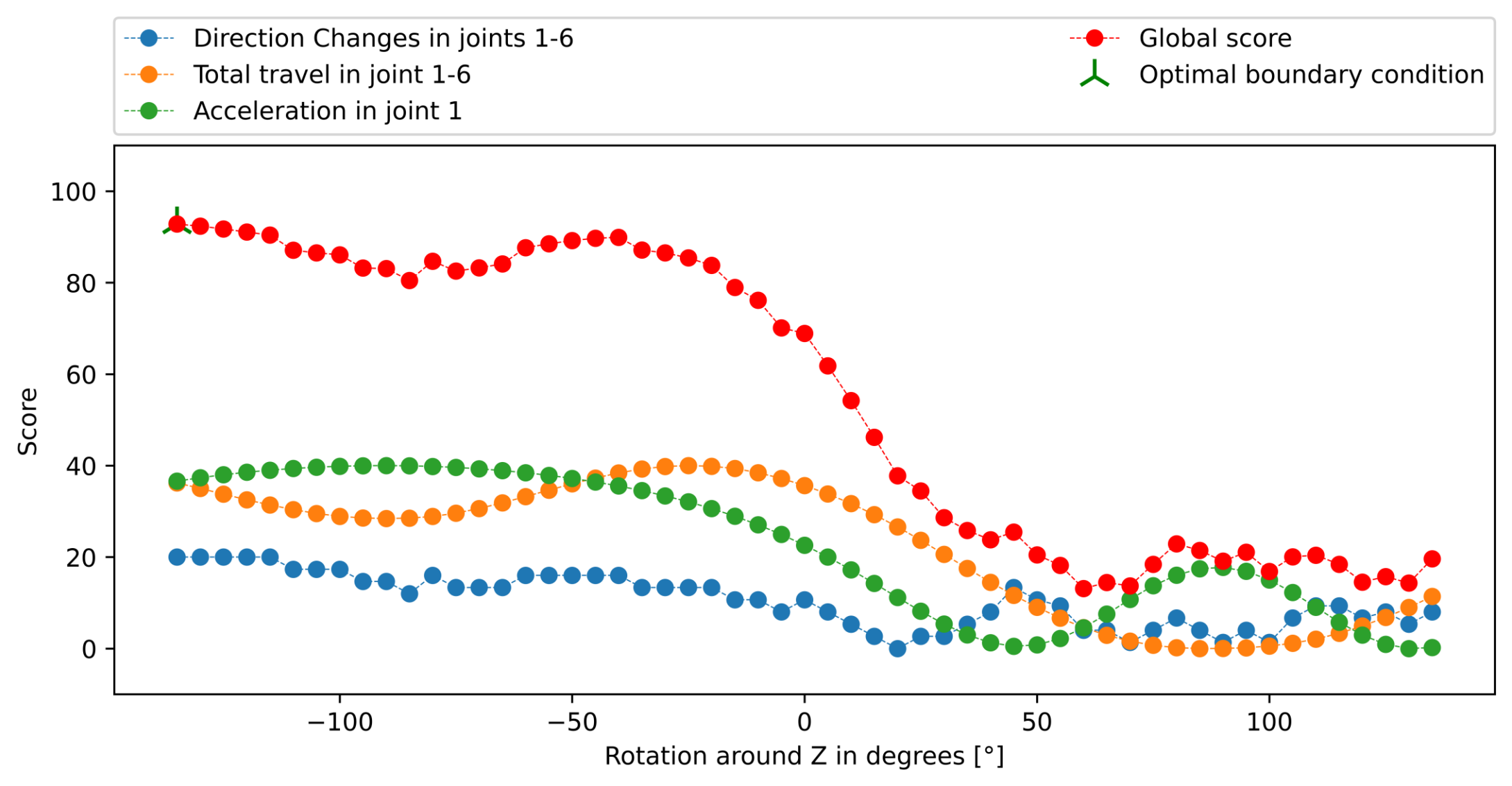
New DH Params

New range:

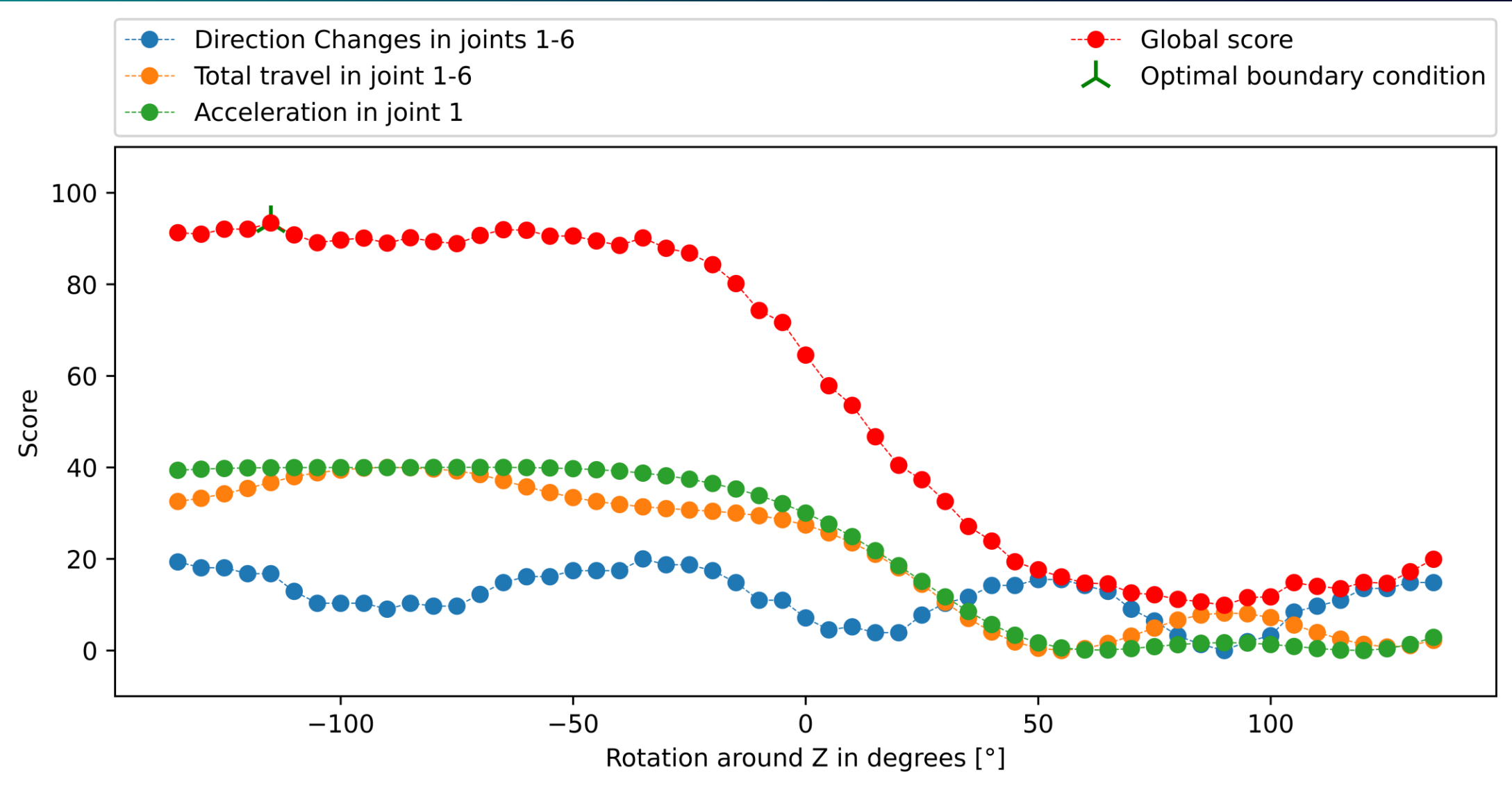
-135° to 135° in 5° steps for C

-45° to 45° for table tilting

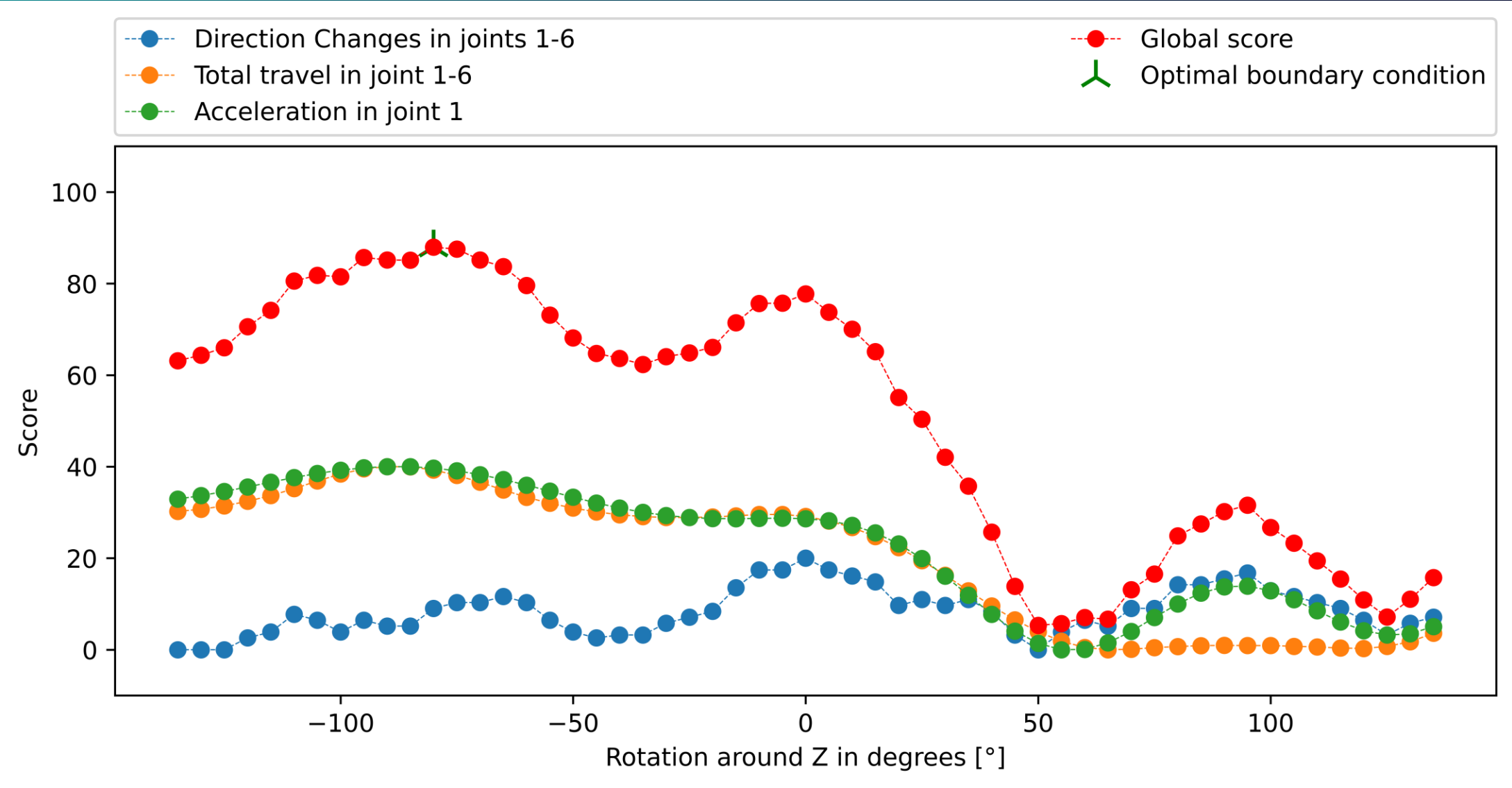
Result 1



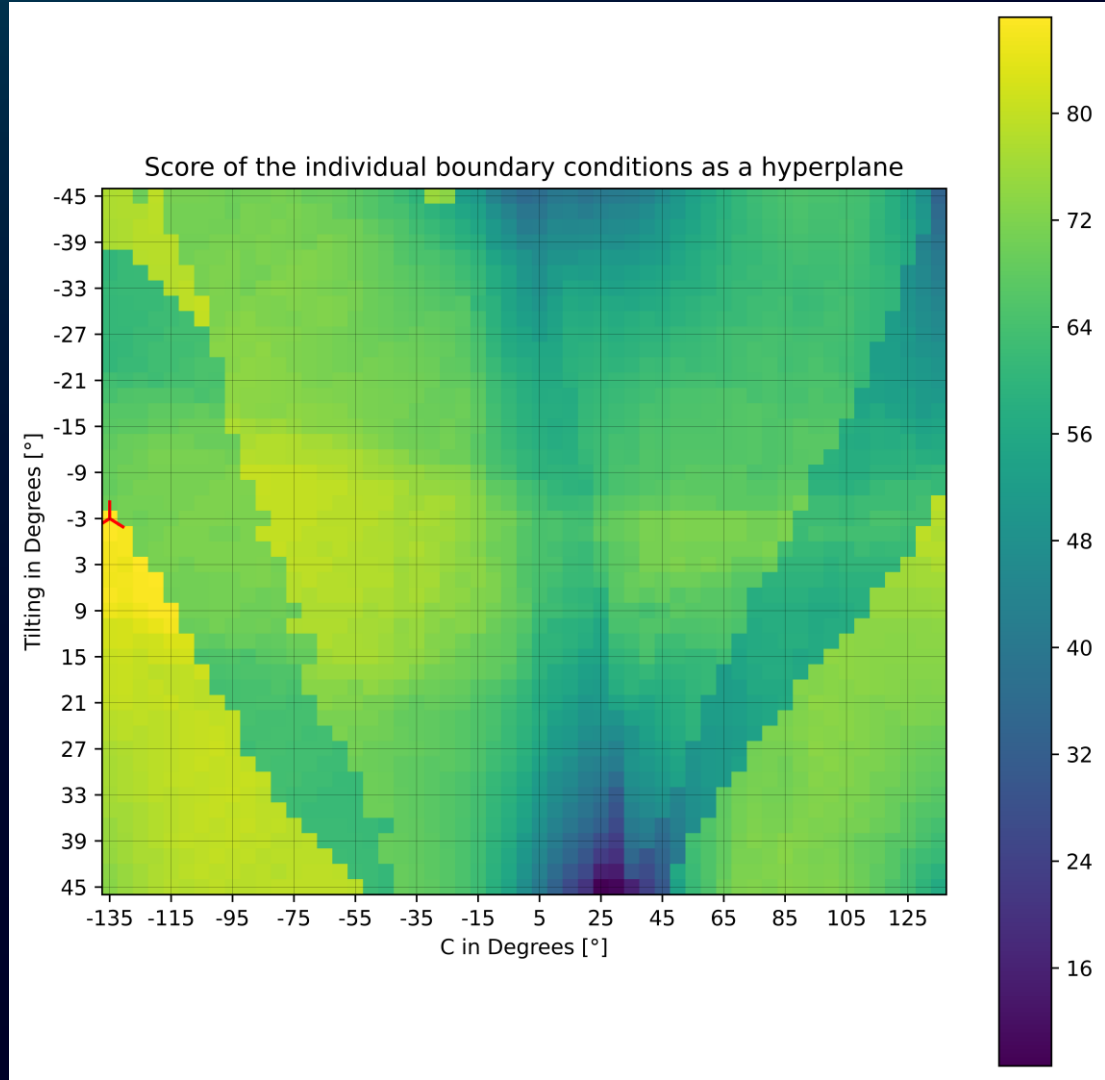
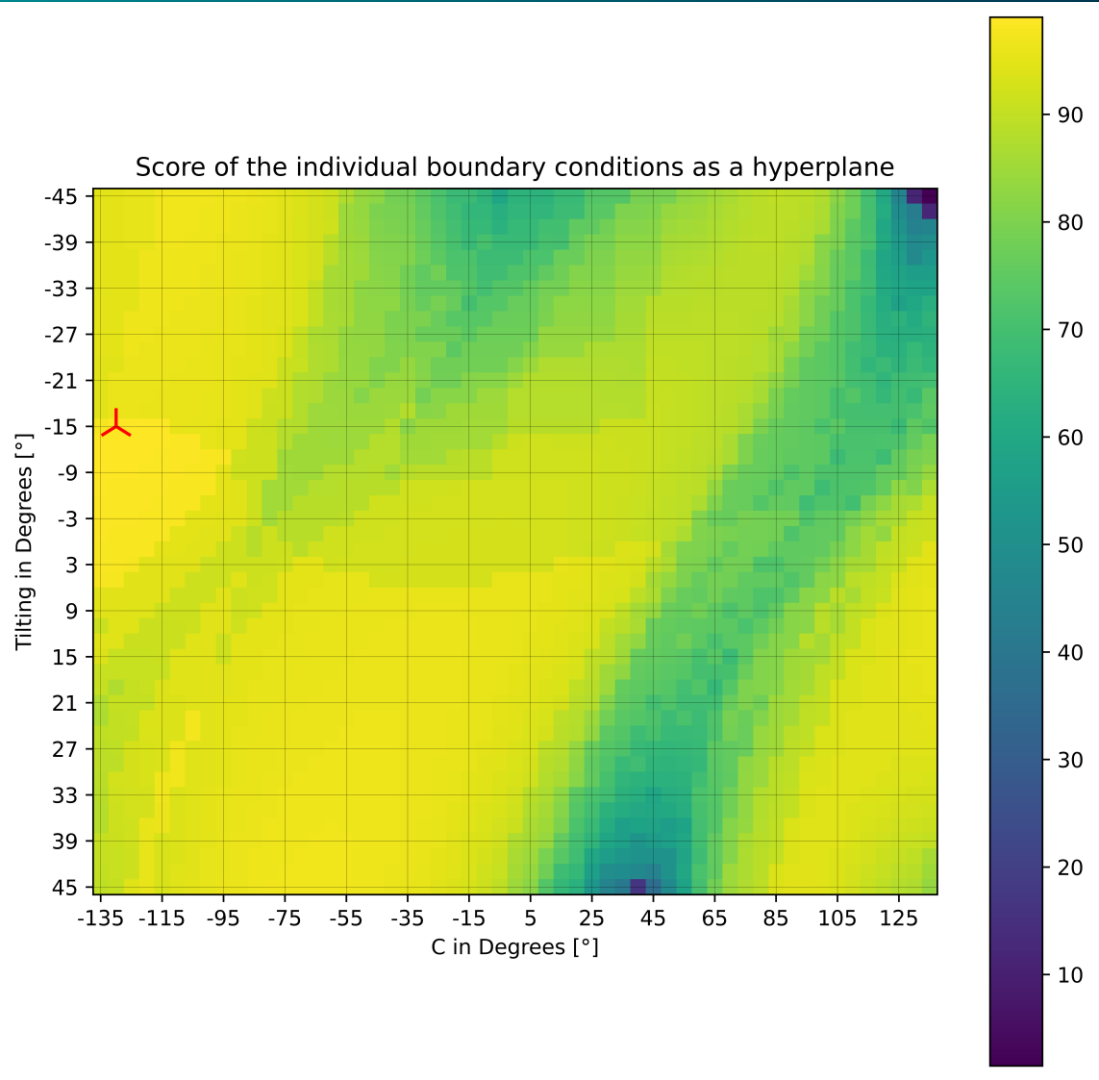
Result 2



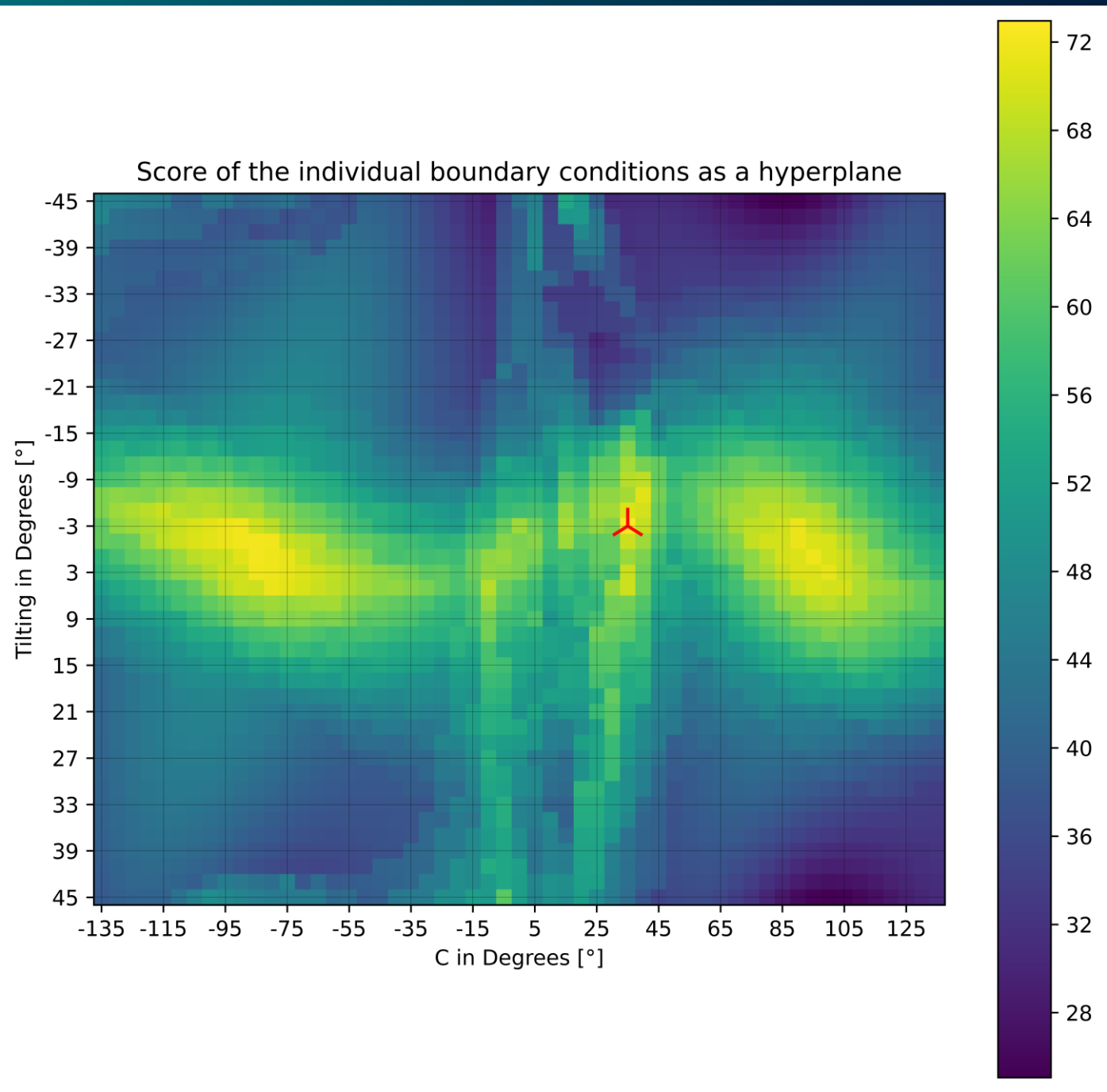
Result 3



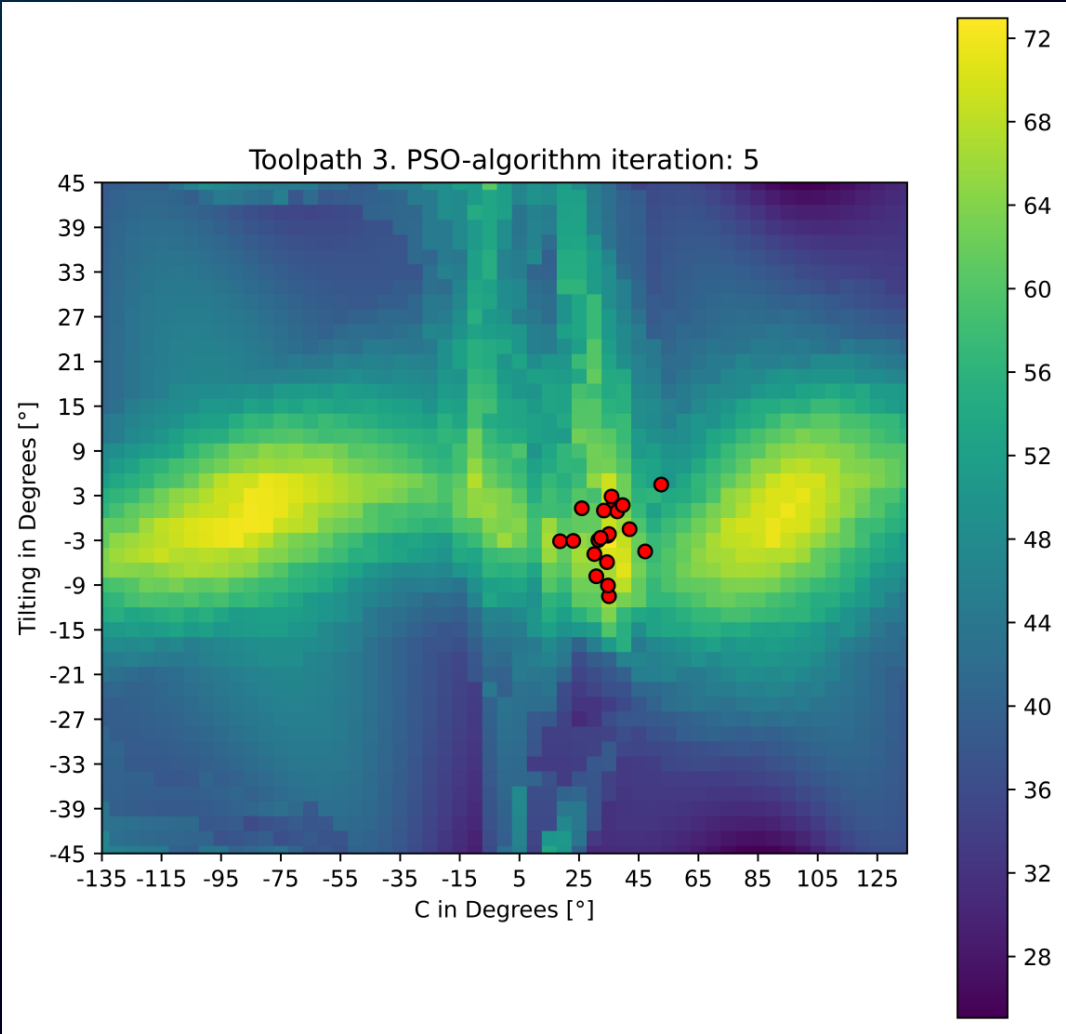
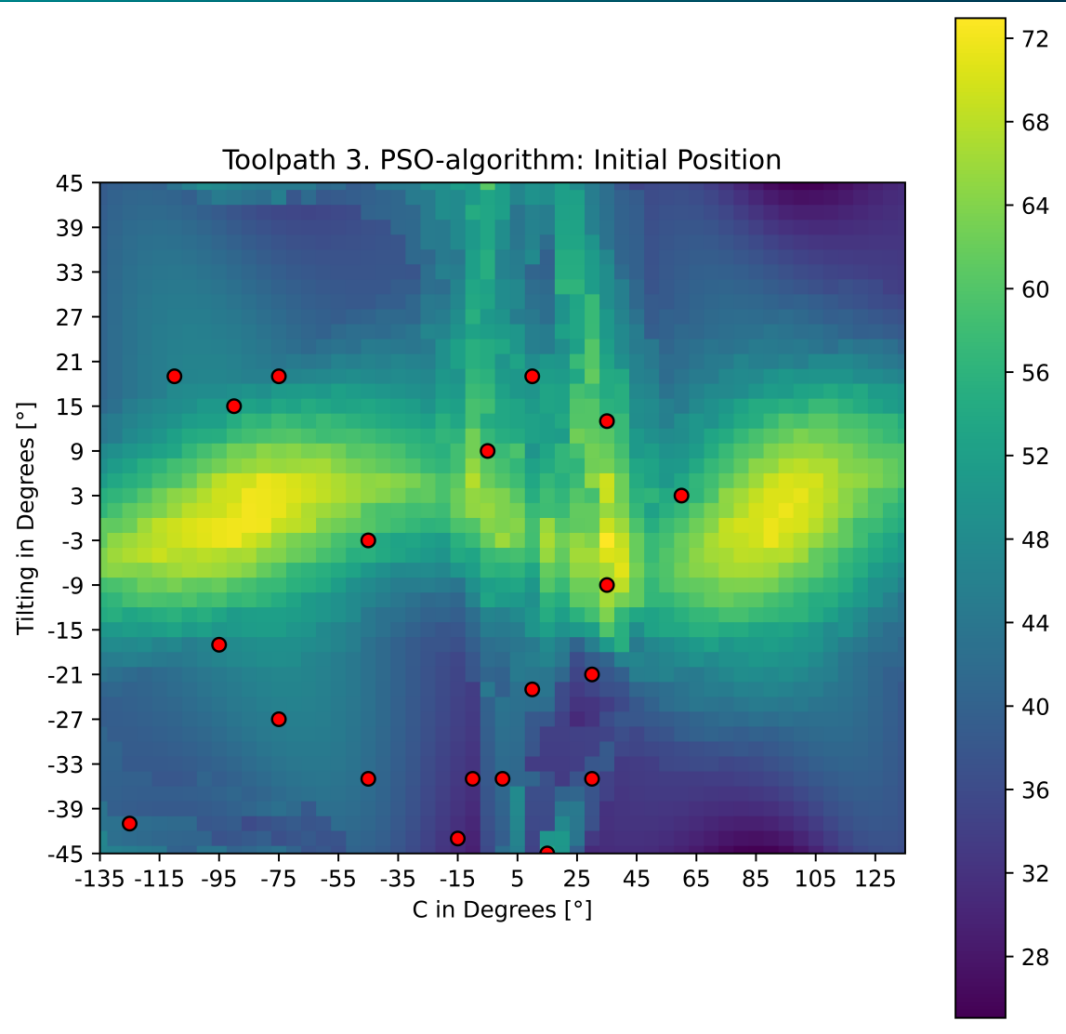
Result 1+2



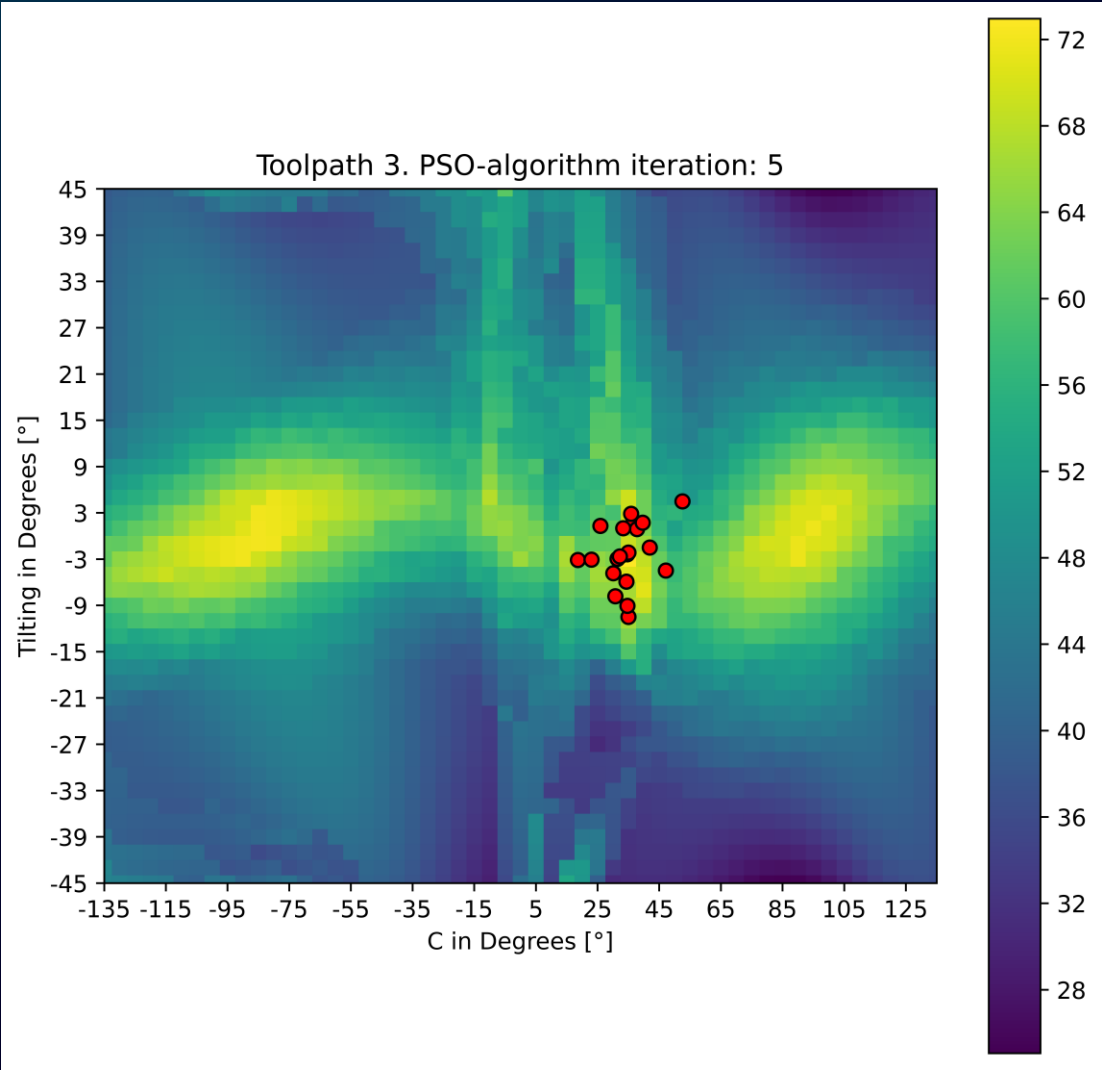
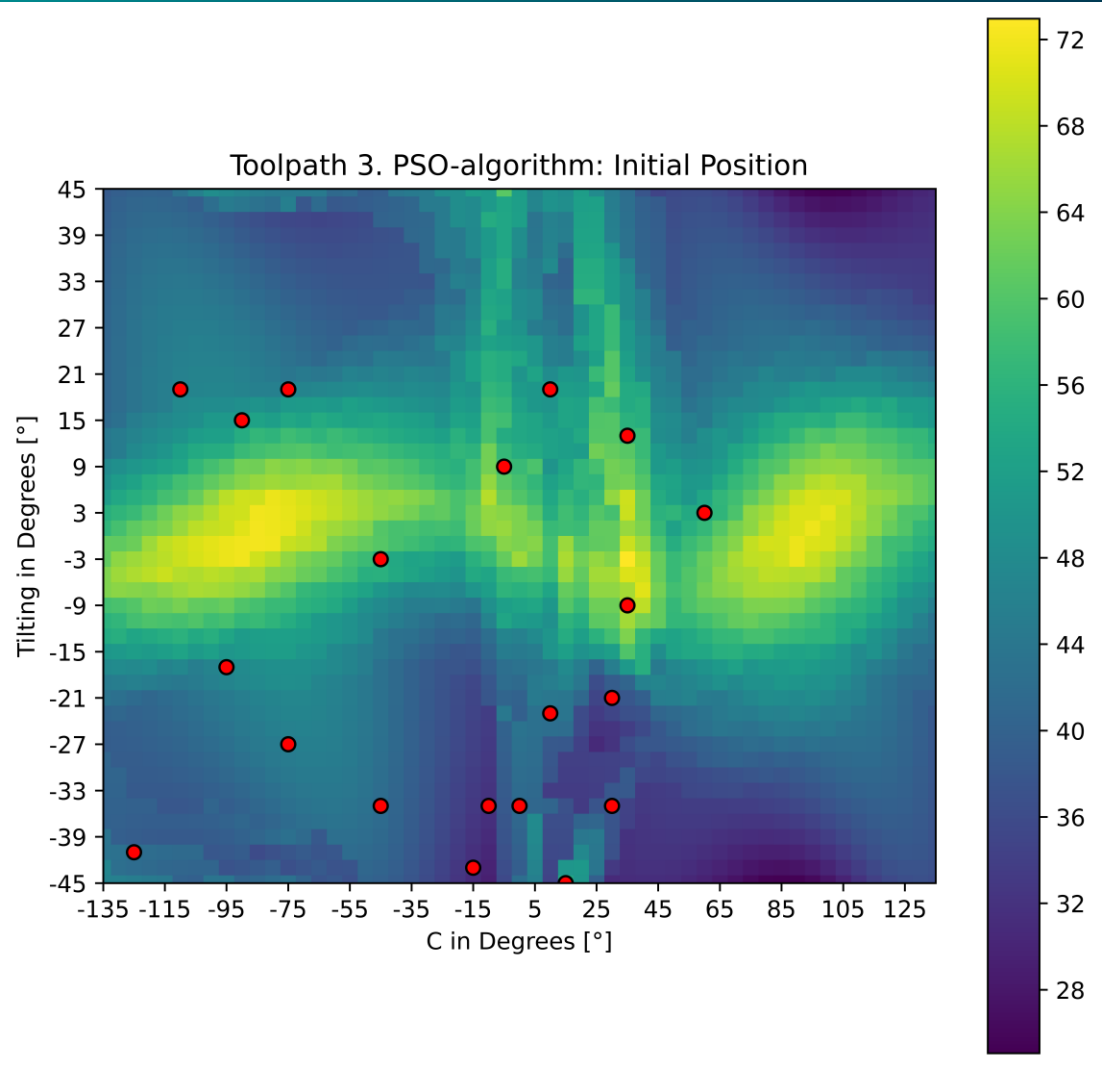
Result 3



Swarm (show cool video here)



Swarm Actual (show cool video here)



Next Steps – Paper

FULL FORCE TO FINISH!

- Discussion
 - Summery
 - Abbreviation
 - Images
 - basic stuff
 - Real G-code (simple but real)
- Very basic explanation

Idea:

Finish PDF as soon as possible.

→ all energy towards paper

Optional:

- Real G-code (1st)
- Real test on robot
- Section-wise Optimization
- Multithreading
- Additional DoF
- ...
- ...

To Do for paper:

- Real G-code
- Real test on robot

Contact

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Christmas planning

DATE:	Ludwig	Marius	Jan
08.12			😊
15.12			😊
22.12			😊
29.12	X		😊
05.01			😊
12.01			😊
19.01			X
26.01			X
02.02			😊

December						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
Phases of the Moon: 5:☾ 13:☿ 19:☾ 27:☿						
Holidays and Observances: 3: First Advent Sunday, 6: Saint Nicholas Day, 10: Second Advent Sunday, 17: Third Advent Sunday, 24: Fourth Advent Sunday, 25: Christmas Day, 26: Boxing Day						

11 Tage
Januar

January						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				
Phases of the Moon: 4:🌑 11:🌒 18:🌓 25:🌔						
Holidays and Observances: 1: New Year's Day, 6: Epiphany (BW, BY, ST)						

February						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
Final PDF						
19	20	21	22 Paper	23	24	25
26	27	28 Paper	29			
Phases of the Moon: 3:☉ 9:☿ 16:☾ 24:☽						
Holidays and Observances: 12: Shrove Monday, 13: Carnival Tuesday, 14: Carnival / Ash Wednesday, 14: Valentine's Day						

12 Tage
Januar

March						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
				Paper ¹	2	3
4	5	6	Paper 7	8	9	10
11	12	13	14	Verteidigung 15	16	17
PowerPoint für Verteidigung						
18	19	20	21	22	23	24
25	26	27	28	29	30	31
Phases of the Moon: 3:☾ 10:● 17:☾ 25:☉						
Holidays and Observances: 8: International Women's Day (Most regions), 24: Palm Sunday, 28: Maundy Thursday (All), 29: Good Friday, 30: Holy Saturday (Many regions), 31: Easter Sunday (Brandenburg)						