

MONO16 1x1 1920x1200

(0 5 10 15 20) USB

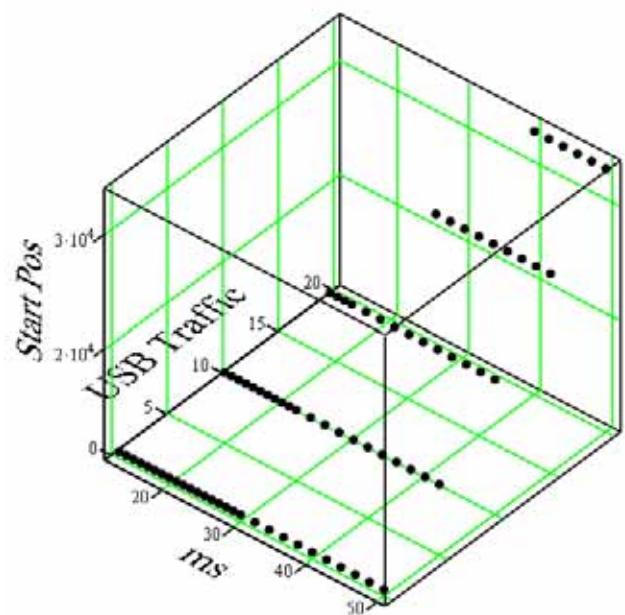
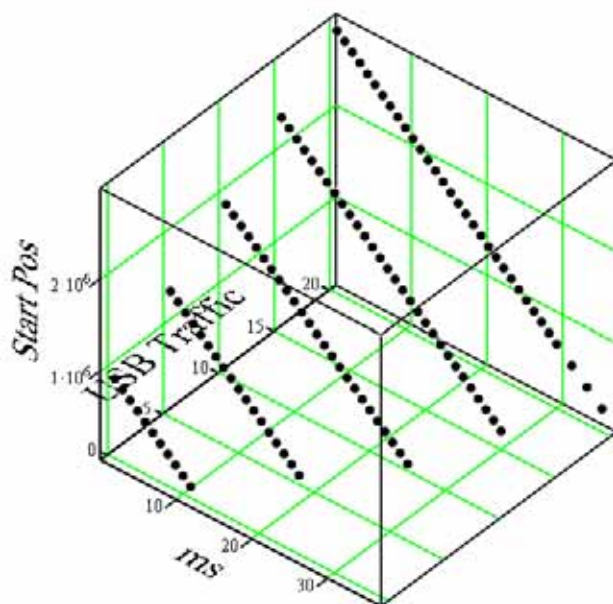
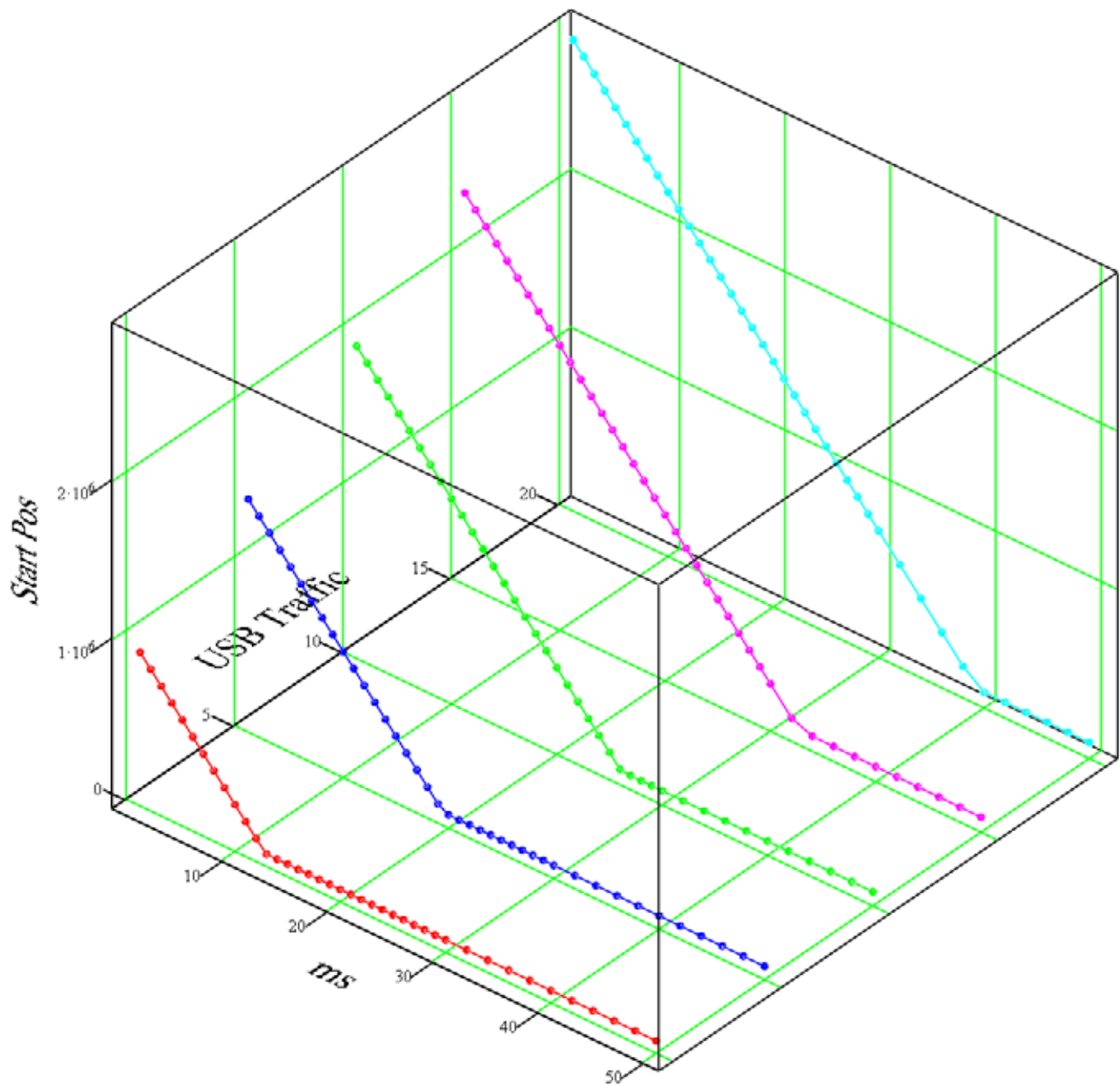
S12 :=	1	902837	1404212	1905104	2406919	2907205
	2	827862	1328627	1830801	2331640	2833393
	3	752885	1254224	1754914	2256362	2757200
	4	677916	1178642	1680605	2181085	2683390
	5	602934	1104239	1604718	2105806	2607195
	6	527961	1028656	1530408	2030529	2533383
	7	452984	954252	1454521	1955253	2457196
	8	378009	878665	1380216	1881951	2383384
	9	303033	804262	1305910	1806673	2307194
	10	228056	728680	1230024	1731396	2233382
	11	153081	654277	1155715	1656118	2157189
	12	78101	578694	1079822	1580838	2083376
	13	10934	504289	1005517	1505560	2007188
	14	10934	428707	929632	1430282	1933376
	15	10934	354304	855326	1356991	1857186
	16	10934	278720	779437	1281711	1783376
	17	10934	204317	705132	1206436	1707181
	18	10934	128730	630822	1131156	1633370
	19	10934	54326	554932	1055877	1557177
	20	10934	16534	480628	980599	1483363
	21	10934	16534	404738	905323	1407176
	22	10934	16534	330436	832023	1333364
	23	10934	16534	254544	756746	1257172
	24	10934	16534	180235	681466	1183360
	25	10934	16534	105928	606189	1107170
	26	10934	16534	30043	530911	1033358
	27	10934	16534	22134	455633	957165
	28	10934	16534	22134	380352	883353
	29	10934	16534	22134	307058	807164
	30	10934	16534	22134	231780	733352
	32	10934	16534	22134	81222	583350
	34	10934	16534	22134	27734	433346
	36	10934	16534	22134	27734	283339
	38	10934	16534	22134	27734	133340
	40	10934	16534	22134	27734	33334
	42	10934	16534	22134	27734	33334
	44	10934	16534	22134	27734	33334
	46	10934	16534	22134	27734	33334
	48	10934	16534	22134	27734	33334
	50	10934	16534	22134	27734	33334

$$\mathbf{USB} := \begin{pmatrix} 0 \\ 5 \\ 10 \\ 15 \\ 20 \end{pmatrix}$$

$$\text{Plane_Start(S12,USB,1)} = \begin{pmatrix} 0 \\ 11 \\ 18 \\ 25 \\ 30 \\ 33 \end{pmatrix}$$

	1	2	3
1	1	902837	0
2	2	827862	0
3	3	752885	0
4	4	677916	0
5	5	602934	0
6	6	527961	0
7	7	452984	0
8	8	378009	...

$$\text{Plane_Start(S12,USB,0)} = \begin{pmatrix} -74975.673 & -74998.975 & -75000.157 & -75000.354 & -74989.256 \\ 977813.855 & 1478962.32 & 1980204.64 & 2481194.246 & 2982644.881 \\ 12.896 & 19.499 & 26.108 & 32.713 & 39.33 \end{pmatrix}$$



MONO16 1x1 1440x900

ms

(0 5 10 15 20) USB

S9 :=

1 671663 1054641 1437128 1820543 2202429

2 596686 979051 1362826 1745264 2128616

3 521708 904650 1286937 1669983 2052423

4 446735 829063 1212631 1594710 1978614

5 371759 754659 1136746 1519431 1902422

6 296785 679078 1062435 1444150 1828608

7 221807 604672 986550 1368875 1752423

8 146834 529092 912237 1295574 1678609

9 71856 454688 837933 1220300 1602412

10 10934 379107 762045 1145022 1528608

11 10934 304702 687738 1069743 1452413

12 10934 229118 611848 994462 1378603

13 10934 154714 537540 919187 1302410

14 10934 79131 461652 843913 1228597

15 10934 16534 387345 770612 1152408

16 10934 16534 311457 695335 1078597

17 10934 16534 237151 620051 1002401

18 10934 16534 162850 544774 928593

19 10934 16534 86958 469504 852401

20 10934 16534 22134 394223 778590

21 10934 16534 22134 318944 702399

22 10934 16534 22134 245647 628585

23 10934 16534 22134 170369 552395

24 10934 16534 22134 95092 478584

25 10934 16534 22134 27734 402389

26 10934 16534 22134 27734 328585

27 10934 16534 22134 27734 252389

28 10934 16534 22134 27734 178574

29 10934 16534 22134 27734 102385

30 10934 16534 22134 27734 33334

32 10934 16534 22134 27734 33334

34 10934 16534 22134 27734 33334

36 10934 16534 22134 27734 33334

38 10934 16534 22134 27734 33334

40 10934 16534 22134 27734 33334

42 10934 16534 22134 27734 33334

44 10934 16534 22134 27734 33334

46 10934 16534 22134 27734 33334

48 10934 16534 22134 27734 33334

50 10934 16534 22134 27734 33334

Plane_Start(S9, USB, 1) =

0

8

13

18

23

28

Plane_Start(S9, USB, 2) =

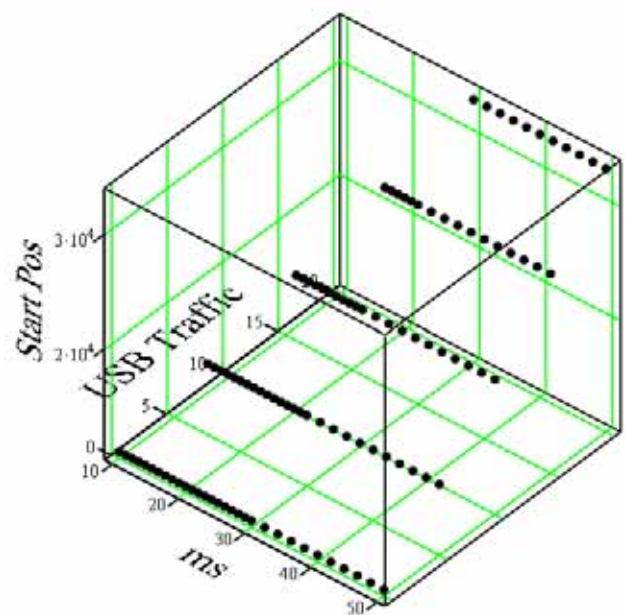
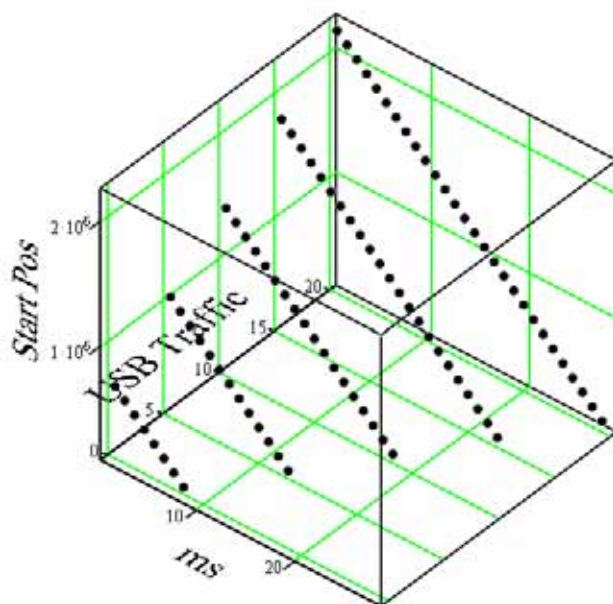
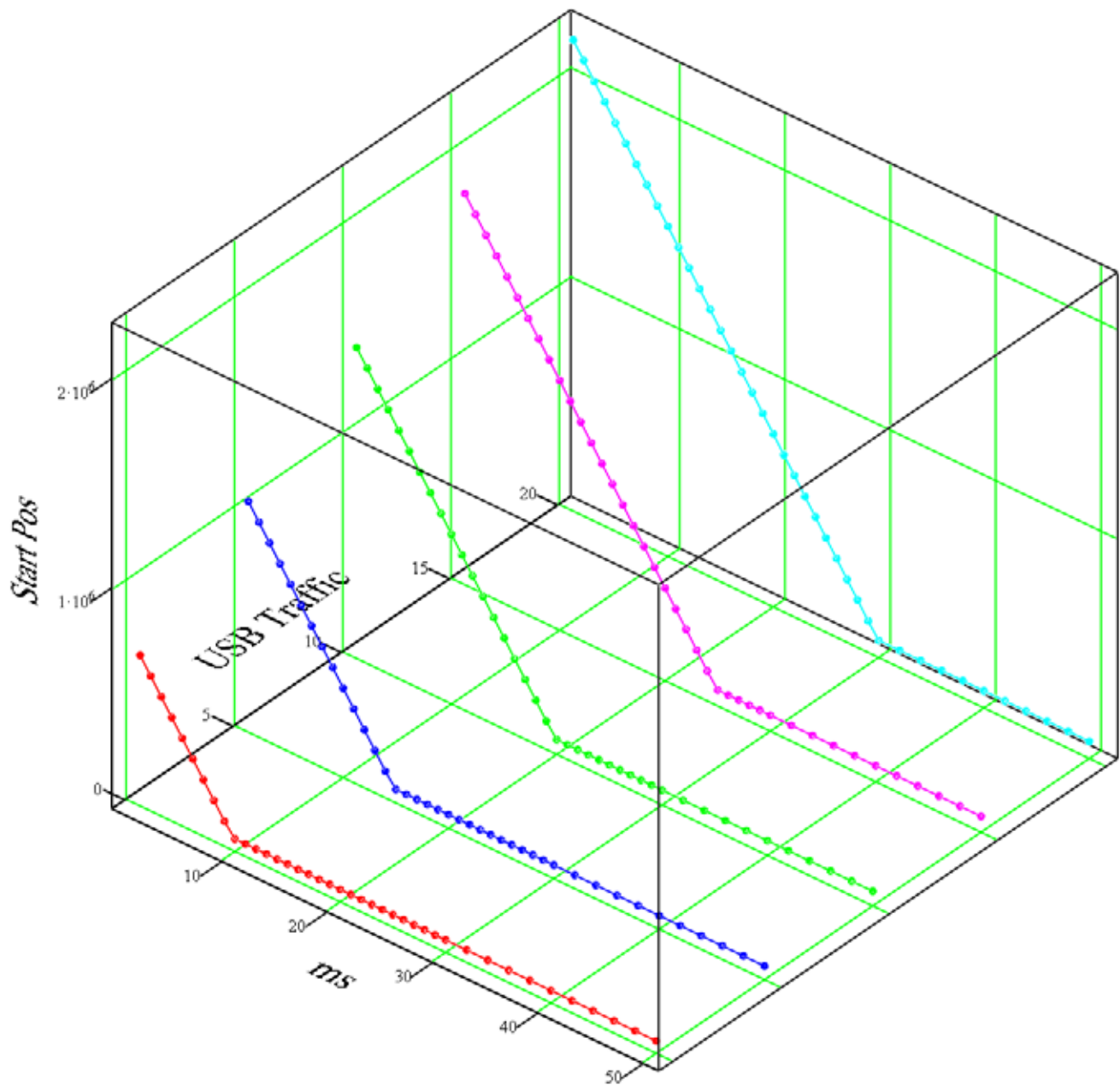
	1	2	3
1	1	671663	0
2	2	596686	0
3	3	521708	0
4	4	446735	0
5	5	371759	0
6	6	296785	0
7	7	221807	...

Plane_Start(S9, USB, 0) =

-74975.512 -74993.489 -75005.411 -75003.943 -74996.958

746636.929 1129357.115 1512276.346 1894856.704 2277958.643

9.813 14.839 19.867 24.894 29.93



MONO16 1x1 800x600

ms

(0 5 10 15 20) USB

S6 :=

1

434239

695613

956509

1218317

1478604

2

359260

620028

882199

1143040

1404793

3

284287

545625

806313

1067765

1328598

4

209306

470042

732009

992486

1254787

5

134336

395634

656118

917205

1178598

6

59360

320055

581808

841928

1104787

7

10934

245654

505923

766647

1028598

8

10934

170065

431616

693350

954787

9

10934

95664

357309

618073

878593

10

10934

20080

281421

542798

804781

11

10934

16534

207115

467516

728587

12

10934

16534

131223

392238

654775

13

10934

16534

56919

316961

578587

14

10934

16534

22134

241689

504775

15

10934

16534

22134

168391

428583

16

10934

16534

22134

93114

354771

17

10934

16534

22134

27734

278580

18

10934

16534

22134

27734

204770

19

10934

16534

22134

27734

128577

20

10934

16534

22134

27734

54764

21

10934

16534

22134

27734

33334

22

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16534

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27734

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22134

27734

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44

10934

16534

22134

27734

33334

46

10934

16534

22134

27734

33334

48

10934

16534

22134

27734

33334

50

10934

16534

22134

27734

33334

Plane_Start(S6,USB,1) =

0

5

9

12

15

19

Plane_Start(S6,USB,2) =

	1	2	3
1	1	434239	0
2	2	359260	0
3	3	284287	0
4	4	209306	0
5	5	134336	0
6	1	695613	5
7	2	620028	...

Plane_Start(S6,USB,0) =

-74976

-74993.567

-75003.626

-75030.361

-75001.465

509213.6

770343.389

1031653.818

1292803.152

1554168.912

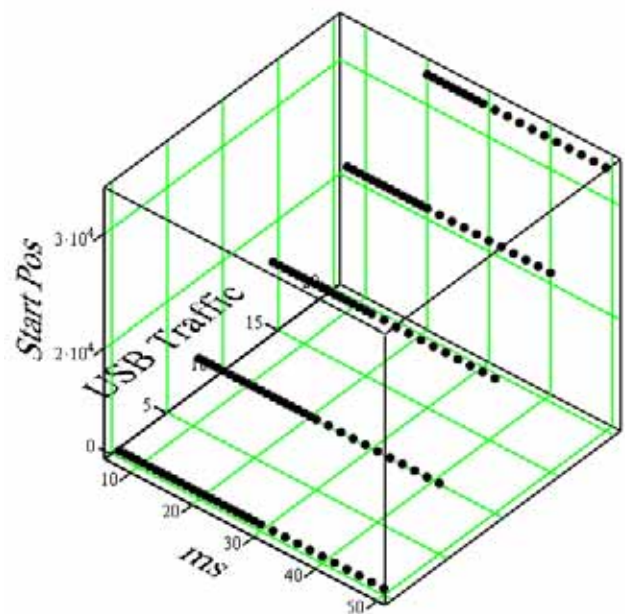
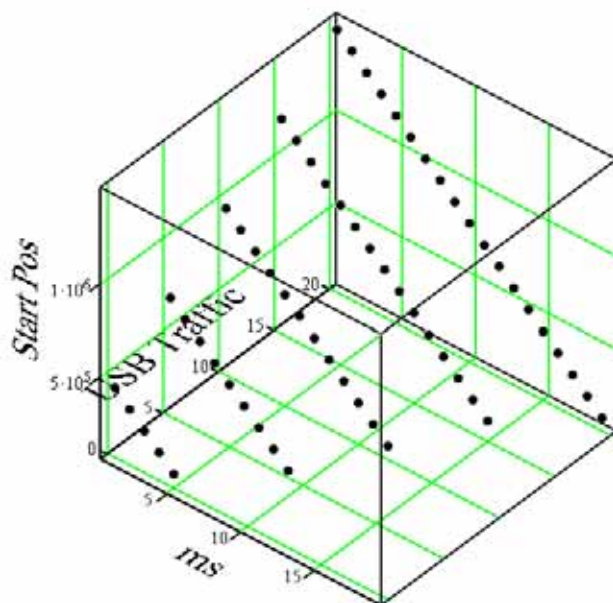
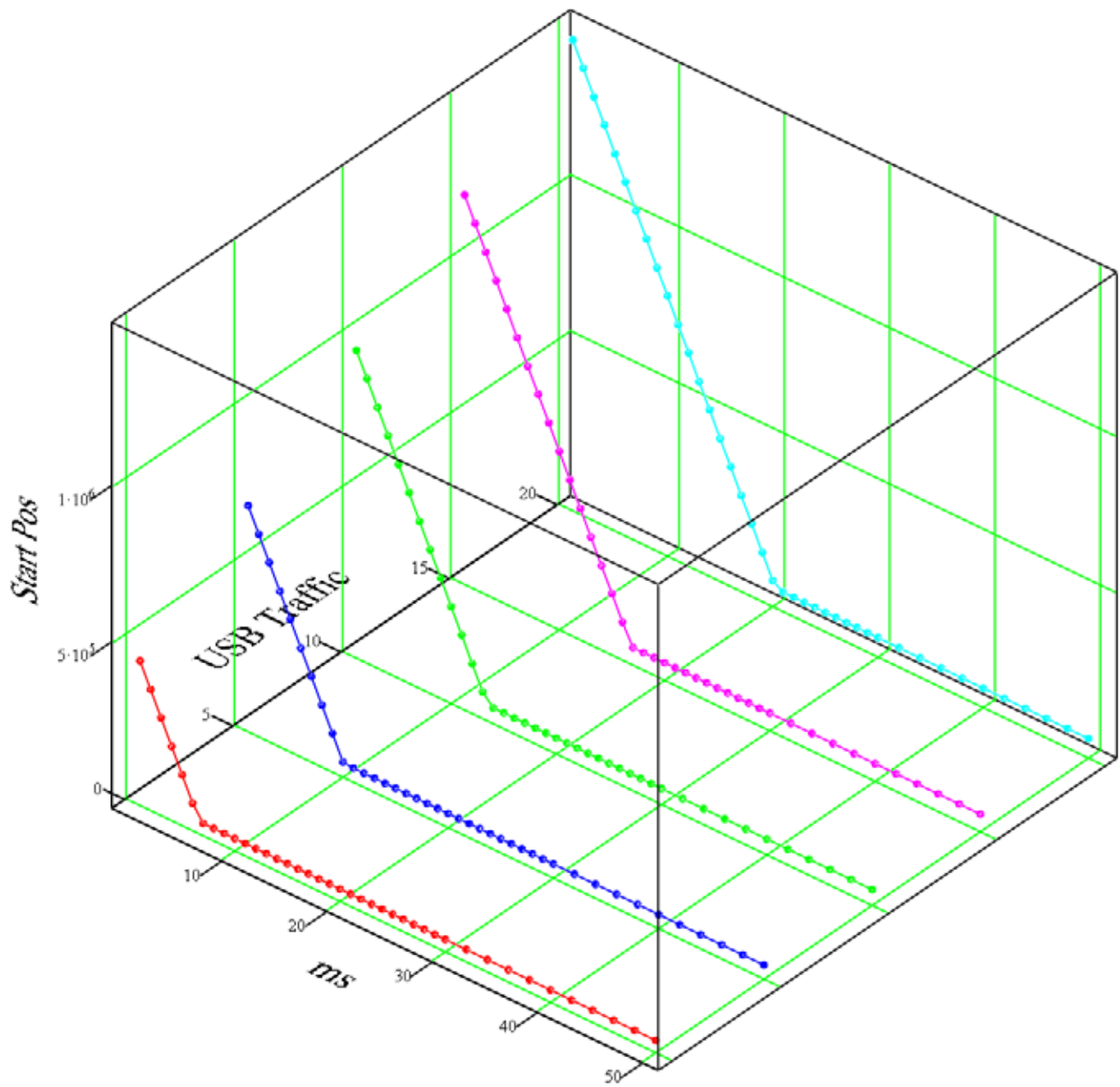
6.646

10.052

13.46

16.861

20.277



$$ms_{1200} := \left(\text{Plane_Start}(S12, USB, 0)^T \right)^{\langle 3 \rangle}$$

$$a12 := \text{neigung}(USB, ms_{1200})$$

$$b12 := \text{achsenabschn}(USB, ms_{1200})$$

$$ms_{900} := \left(\text{Plane_Start}(S9, USB, 0)^T \right)^{\langle 3 \rangle}$$

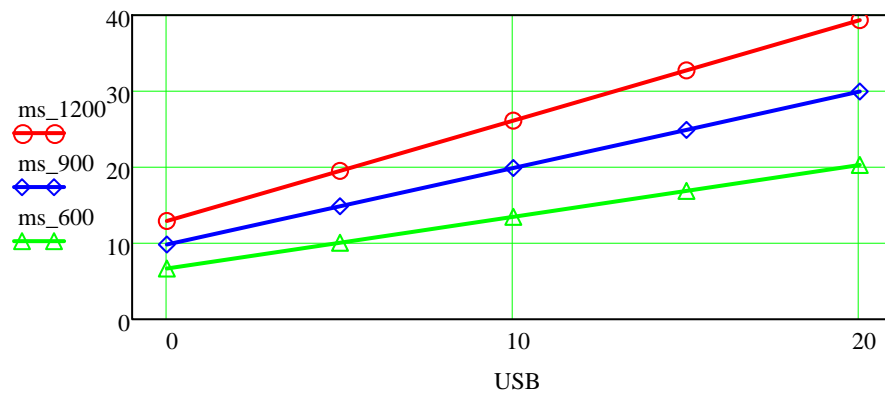
$$a9 := \text{neigung}(USB, ms_{900})$$

$$b9 := \text{achsenabschn}(USB, ms_{900})$$

$$ms_{600} := \left(\text{Plane_Start}(S6, USB, 0)^T \right)^{\langle 3 \rangle}$$

$$a6 := \text{neigung}(USB, ms_{600})$$

$$b6 := \text{achsenabschn}(USB, ms_{600})$$



$$a12 = 1.322$$

$$b12 = 12.893$$

$$a9 = 1.006$$

$$b9 = 9.811$$

$$a6 = 0.681$$

$$b6 = 6.645$$

$$\frac{-b12}{a12} = -9.755$$

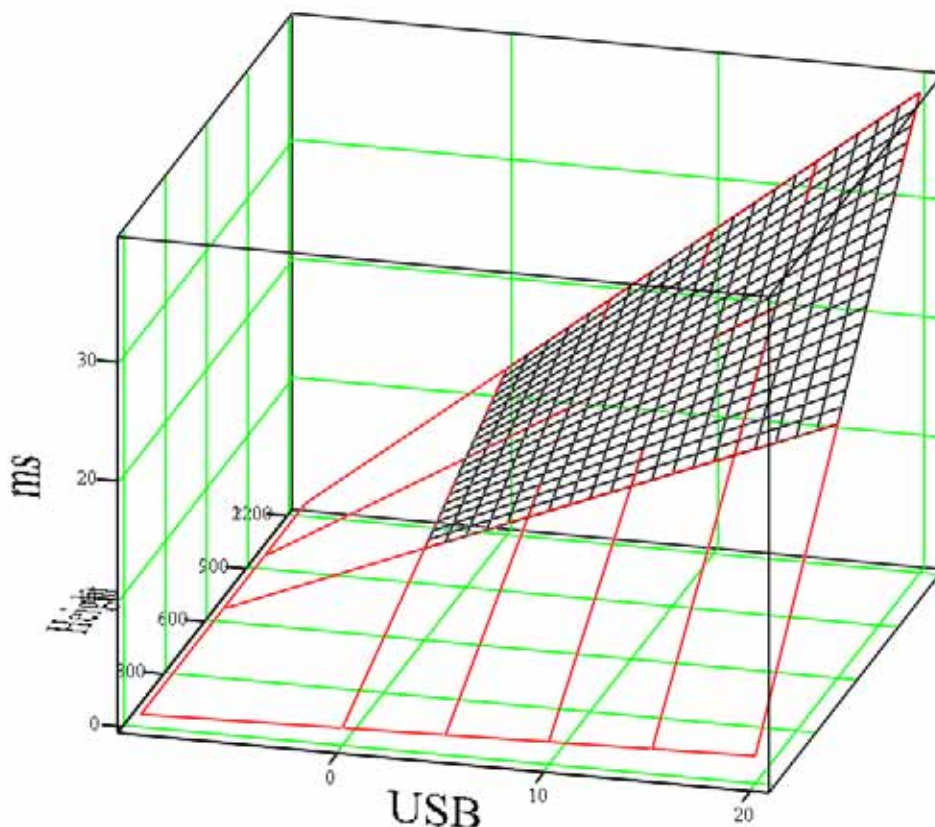
$$\frac{-b9}{a9} = -9.754$$

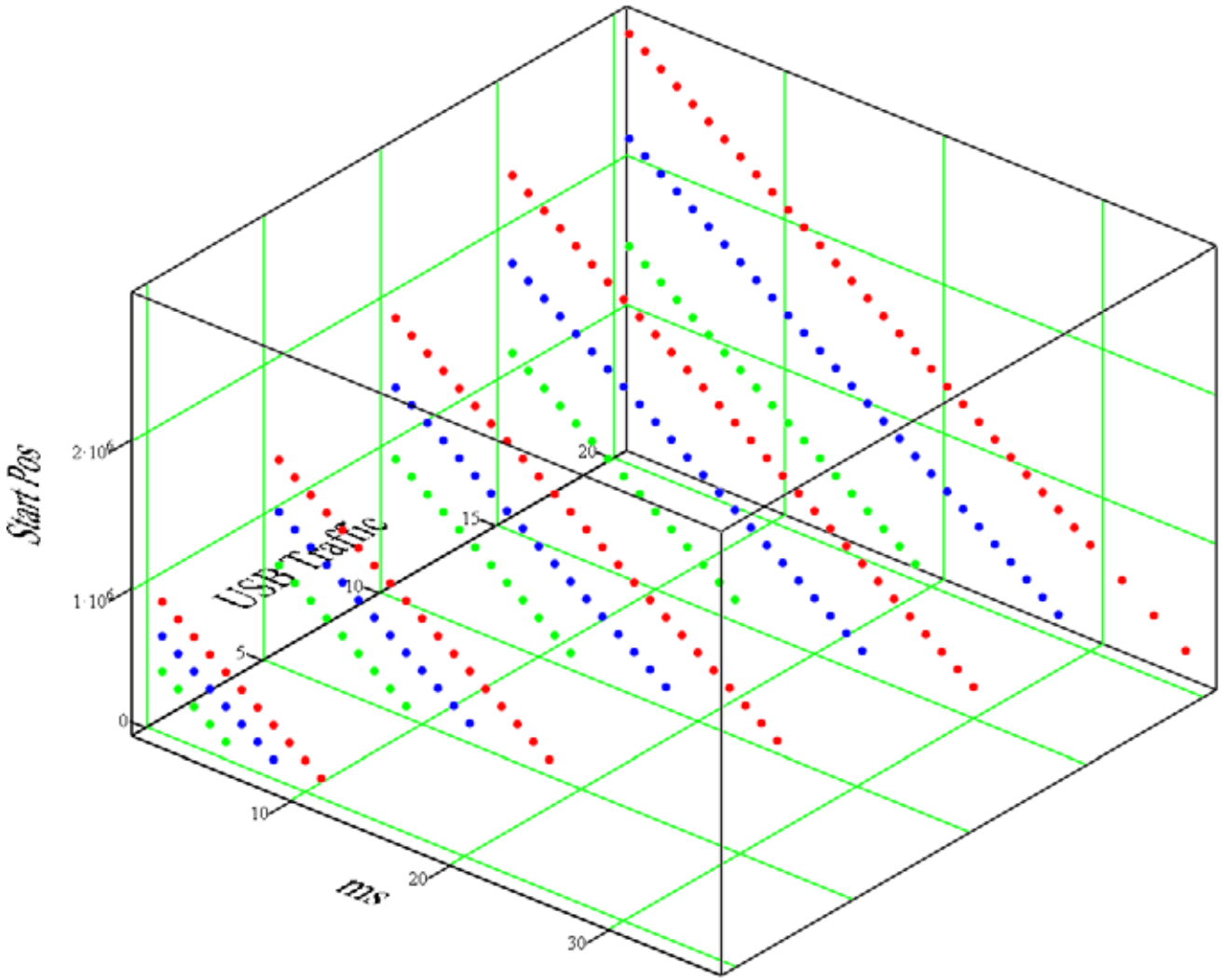
$$\frac{-b6}{a6} = -9.751$$

$$\text{neigung} \left[\begin{pmatrix} 1200 \\ 900 \\ 600 \end{pmatrix}, \begin{pmatrix} a12 \\ a9 \\ a6 \end{pmatrix} \right] = 0.001066962093$$

$$\text{achsenabschn} \left[\begin{pmatrix} 1200 \\ 900 \\ 600 \end{pmatrix}, \begin{pmatrix} a12 \\ a9 \\ a6 \end{pmatrix} \right] = 0.042680363135$$

$$\text{Time_limit} = (\text{usb} + 9.76) \cdot (0.001067 \cdot \text{Height} + 0.0421)$$





$$M12 := \text{erweitern}(S_L1^{\langle 1 \rangle}, S_L1^{\langle 3 \rangle}, 0 \cdot S_L1^{\langle 3 \rangle} + 1)$$

$$M9 := \text{erweitern}(S_L2^{\langle 1 \rangle}, S_L2^{\langle 3 \rangle}, 0 \cdot S_L2^{\langle 3 \rangle} + 1)$$

$$M6 := \text{erweitern}(S_L3^{\langle 1 \rangle}, S_L3^{\langle 3 \rangle}, 0 \cdot S_L3^{\langle 3 \rangle} + 1)$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} := (M12^T \cdot M12)^{-1} \cdot M12^T \cdot S_L1^{\langle 2 \rangle}$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} = \begin{pmatrix} -74996.232 \\ 100242.601 \\ 977738.286 \end{pmatrix}$$

$$T12 := a12 \cdot S_L1^{\langle 1 \rangle} + b12 \cdot S_L1^{\langle 3 \rangle} + c12$$

$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} := (M9^T \cdot M9)^{-1} \cdot M9^T \cdot S_L2^{\langle 2 \rangle}$$

$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} = \begin{pmatrix} -74999.673 \\ 76563.699 \\ 746581.996 \end{pmatrix}$$

$$T9 := a9 \cdot S_L2^{\langle 1 \rangle} + b9 \cdot S_L2^{\langle 3 \rangle} + c9$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} := (M6^T \cdot M6)^{-1} \cdot M6^T \cdot S_L3^{\langle 2 \rangle}$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} = \begin{pmatrix} -75007.8 \\ 52245.992 \\ 509179.773 \end{pmatrix}$$

$$T6 := a6 \cdot S_L3^{\langle 1 \rangle} + b6 \cdot S_L3^{\langle 3 \rangle} + c6$$

$$M := \text{erweitern} \left[\begin{pmatrix} 600 \\ 900 \\ 1200 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \right]$$

$$K_a := (M^T \cdot M)^{-1} \cdot M^T \cdot \begin{pmatrix} a6 \\ a9 \\ a12 \end{pmatrix}$$

$$K_b := (M^T \cdot M)^{-1} \cdot M^T \cdot \begin{pmatrix} b6 \\ b9 \\ b12 \end{pmatrix}$$

$$K_c := (M^T \cdot M)^{-1} \cdot M^T \cdot \begin{pmatrix} c6 \\ c9 \\ c12 \end{pmatrix}$$

$$K_a = \begin{pmatrix} 0.0192794071 \\ -75018.5866594854 \end{pmatrix}$$

$$K_b = \begin{pmatrix} 79.9943473784 \\ 4355.8514243832 \end{pmatrix}$$

$$K_c = \begin{pmatrix} 780.9308547693 \\ 41662.2486268927 \end{pmatrix}$$

$$K_a := \begin{pmatrix} 0.0192794071 \\ -75018.5866594854 \end{pmatrix}$$

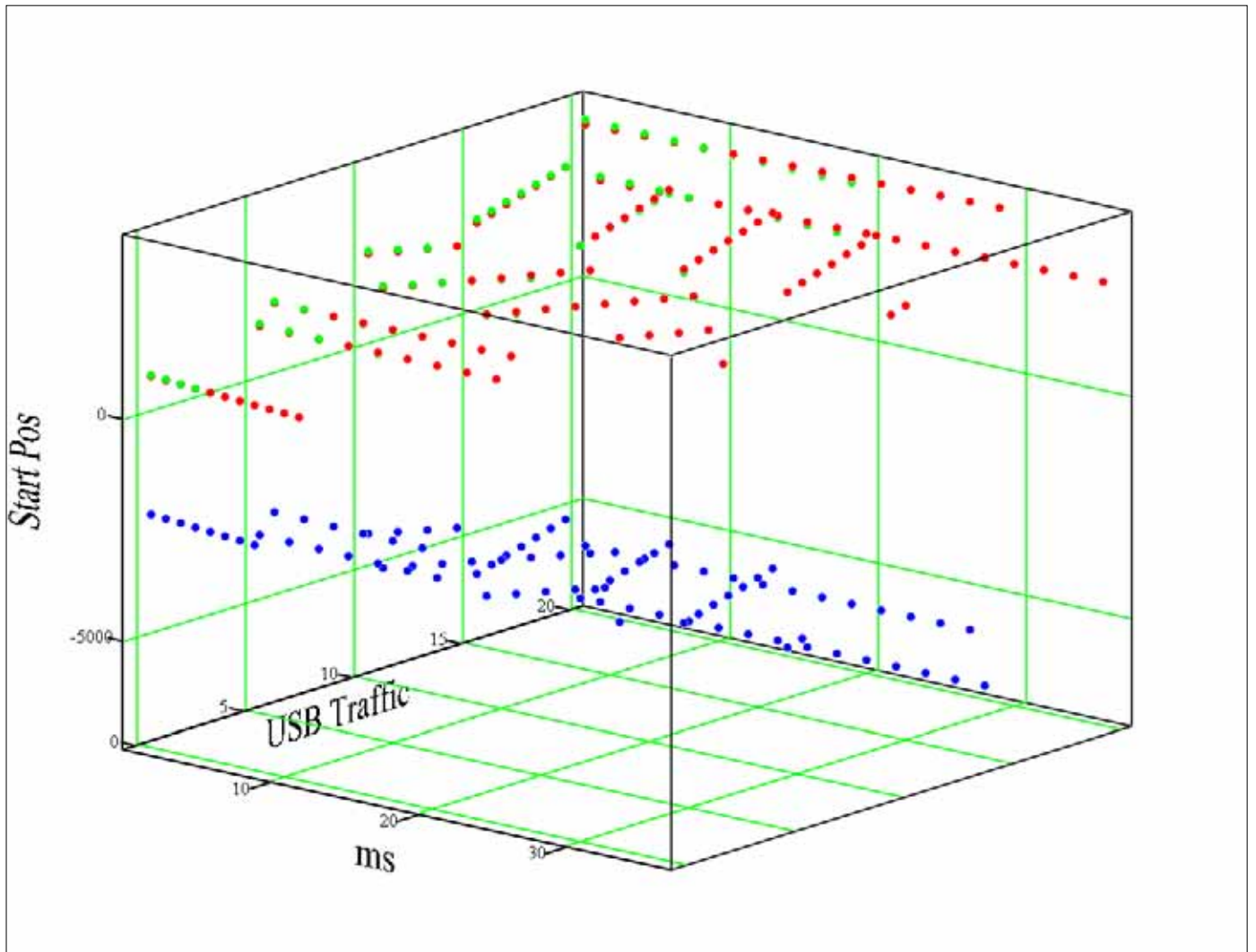
$$K_b := \begin{pmatrix} 79.9943473784 \\ 4355.8514243832 \end{pmatrix}$$

$$K_c := \begin{pmatrix} 780.9308547693 \\ 41662.2486268927 \end{pmatrix}$$

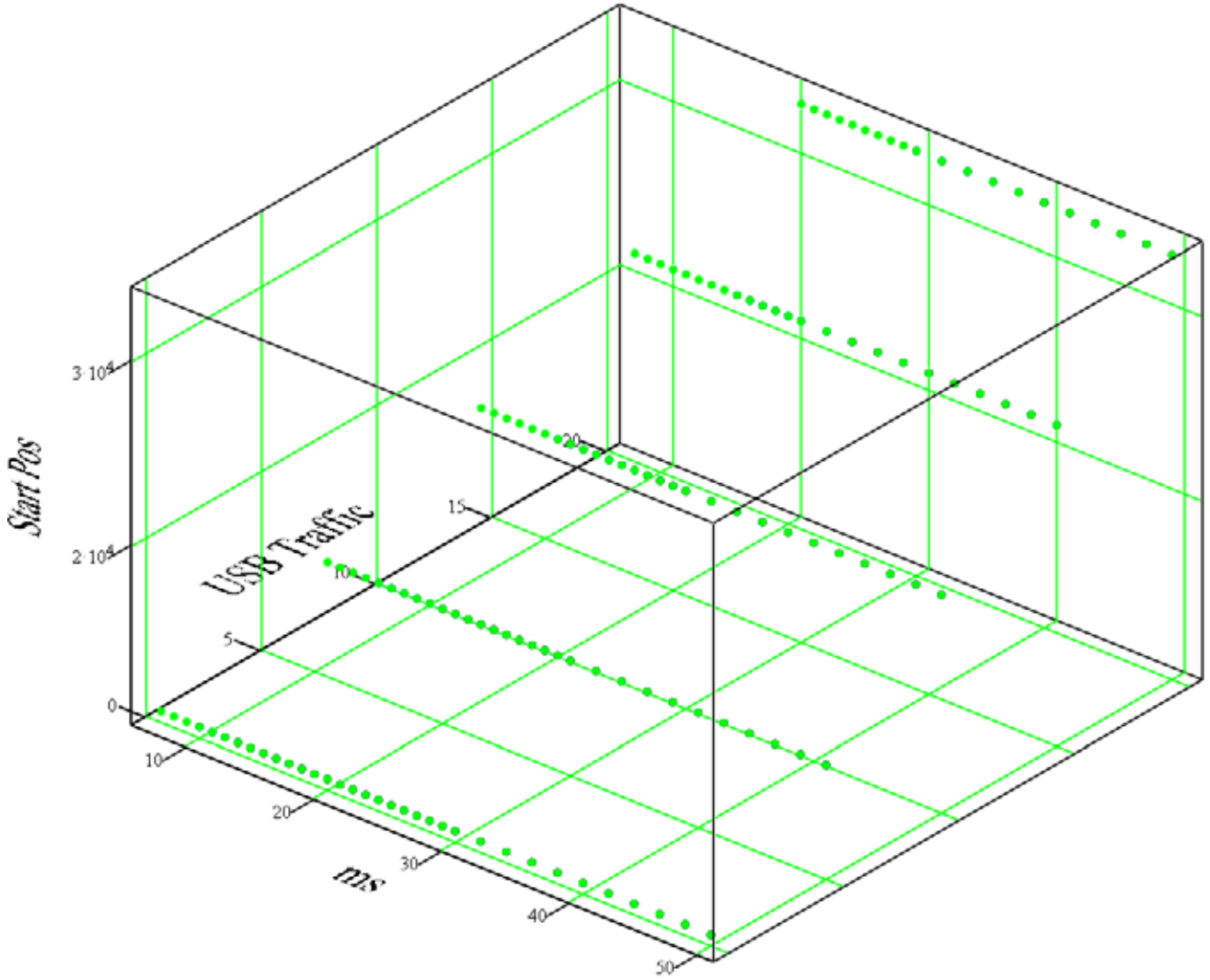
$$H := 1200 \quad SP_{12} := (K_{a1} \cdot H + K_{a2}) \cdot S_{L1}^{(1)} + (K_{b1} \cdot H + K_{b2}) \cdot S_{L1}^{(3)} + (K_{c1} \cdot H + K_{c2})$$

$$H := 900 \quad SP_9 := (K_{a1} \cdot H + K_{a2}) \cdot S_{L2}^{(1)} + (K_{b1} \cdot H + K_{b2}) \cdot S_{L2}^{(3)} + (K_{c1} \cdot H + K_{c2})$$

$$H := 600 \quad SP_6 := (K_{a1} \cdot H + K_{a2}) \cdot S_{L3}^{(1)} + (K_{b1} \cdot H + K_{b2}) \cdot S_{L3}^{(3)} + (K_{c1} \cdot H + K_{c2})$$



$$(S_{L1}^{(1)}, S_{L1}^{(3)}, SP_{12} - S_{L1}^{(2)}), (S_{L2}^{(1)}, S_{L2}^{(3)}, SP_9 - S_{L2}^{(2)}), (S_{L3}^{(1)}, S_{L3}^{(3)}, SP_6 - S_{L3}^{(2)})$$



$$M12 := \text{erweitern}(S_R1^{\langle 1 \rangle}, S_R1^{\langle 3 \rangle}, 0 \cdot S_R1^{\langle 3 \rangle} + 1)$$

$$M9 := \text{erweitern}(S_R2^{\langle 1 \rangle}, S_R2^{\langle 3 \rangle}, 0 \cdot S_R2^{\langle 3 \rangle} + 1)$$

$$M6 := \text{erweitern}(S_R3^{\langle 1 \rangle}, S_R3^{\langle 3 \rangle}, 0 \cdot S_R3^{\langle 3 \rangle} + 1)$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} := (M12^T \cdot M12)^{-1} \cdot M12^T \cdot S_R1^{\langle 2 \rangle}$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} = \begin{pmatrix} 0 \\ 1120 \\ 10934 \end{pmatrix}$$

$$T12 := a12 \cdot S_R1^{\langle 1 \rangle} + b12 \cdot S_R1^{\langle 3 \rangle} + c12$$

$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} := (M9^T \cdot M9)^{-1} \cdot M9^T \cdot S_R2^{\langle 2 \rangle}$$

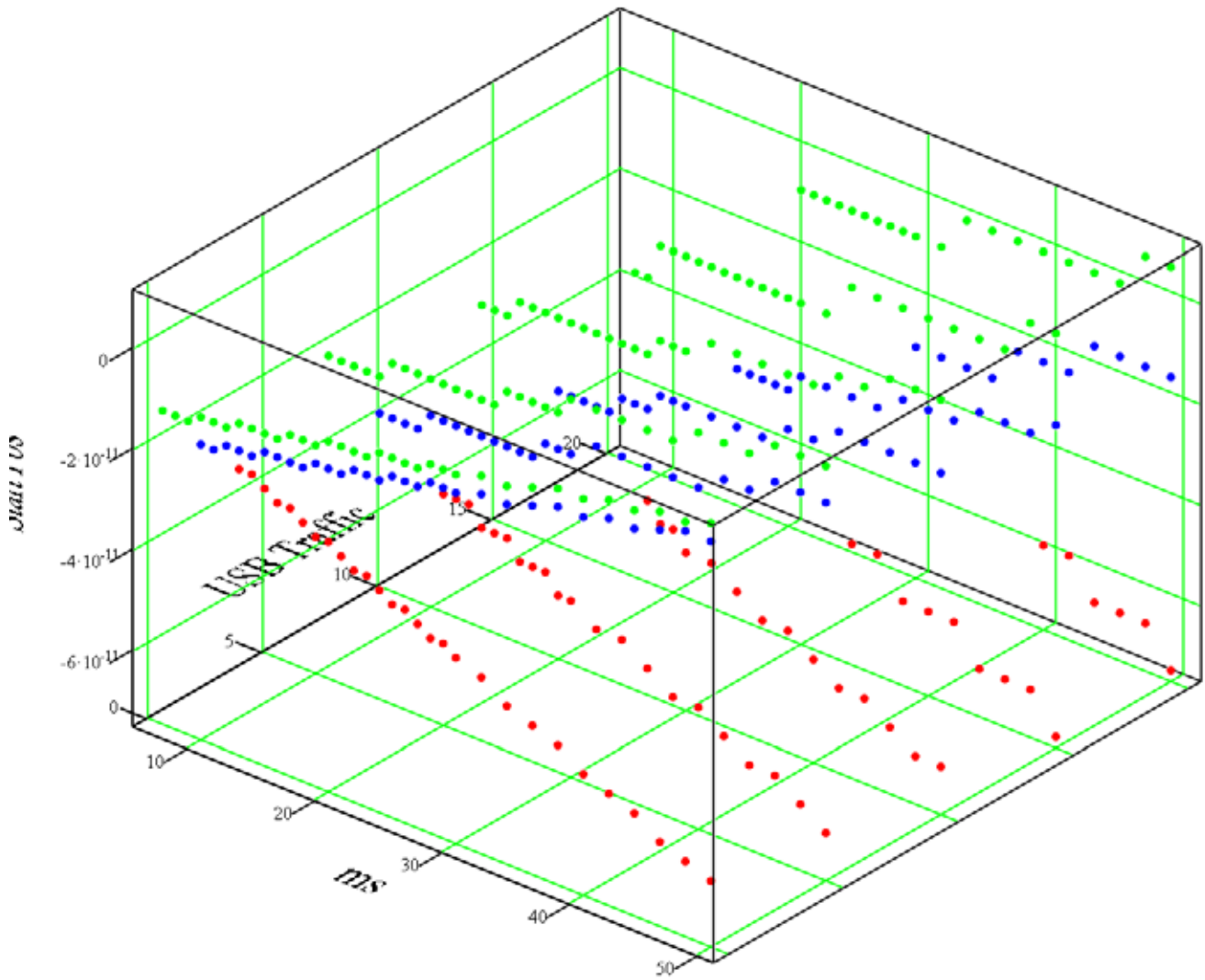
$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} = \begin{pmatrix} -0 \\ 1120 \\ 10934 \end{pmatrix}$$

$$T9 := a9 \cdot S_R2^{\langle 1 \rangle} + b9 \cdot S_R2^{\langle 3 \rangle} + c9$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} := (M6^T \cdot M6)^{-1} \cdot M6^T \cdot S_R3^{\langle 2 \rangle}$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} = \begin{pmatrix} -0 \\ 1120 \\ 10934 \end{pmatrix}$$

$$T6 := a6 \cdot S_R3^{\langle 1 \rangle} + b6 \cdot S_R3^{\langle 3 \rangle} + c6$$



$$(S_{R1}^{(1)}, S_{R1}^{(3)}, S_{R1}^{(2)} - T12), (S_{R2}^{(1)}, S_{R2}^{(3)}, S_{R2}^{(2)} - T9), (S_{R3}^{(1)}, S_{R3}^{(3)}, S_{R3}^{(2)} - T6)$$

$$\text{Time_limit} = (\text{usb} + 9.76) \cdot (0.001067 \cdot \text{Height} + 0.0421)$$

Time shorter than Time_limit

$$\text{StartPos} := [(0.0000390615 \cdot H - 0.0707123) \cdot H - 74967.6652] \cdot \text{ms} + [(-0.0035966154 \cdot H + 86.4884205) \cdot H + 1635.68176] \cdot \text{usb}$$

$$\text{StartPos} := \text{StartPos} + (-0.0344038914 \cdot H + 842.6668063) \cdot H + 16080.628624$$

Time longer than Time_limit

$$\text{StartPos} = 1120 \cdot \text{usb} + 10939$$

Robin last equation.

$$80 \cdot H \cdot \text{usb} + 4210 \cdot \text{usb} + 778 \cdot H + 44510 - 75000 \cdot \text{ms}$$

Result with 1 degree:

$$(-0.01928 \cdot H - 75018.5867) \cdot \text{ms} + (79.9943 \cdot H + 4355.8514) \cdot \text{usb} + 780.9309 \cdot H + 41662$$