

MONO16 1x1 1920x1200

(0 5 10 15 20) USB

S12 :=

1	902839	1404215	1905109	2406919	2907205
2	827863	1328631	1830802	2331641	2833396
3	752888	1254225	1754915	2256365	2757207
4	677912	1178642	1680608	2181084	2683392
5	602937	1104239	1604719	2105807	2607200
6	527962	1028656	1530411	2030529	2533387
7	452985	954253	1454526	1955251	2457196
8	378008	878668	1380218	1881954	2383387
9	303033	804264	1305911	1806677	2307193
10	228053	728682	1230021	1731400	2233383
11	153081	654278	1155714	1656119	2157191
12	78103	578693	1079828	1580842	2083379
13	10939	504292	1005521	1505564	2007187
14	10939	428704	929631	1430287	1933375
15	10939	354306	855327	1356989	1857183
16	10939	278708	779437	1281712	1783372
17	10939	204316	705130	1206435	1707183
18	10939	128733	630824	1131154	1633370
19	10939	54330	554935	1055877	1557179
20	10939	16539	480630	980599	1483366
21	10939	16539	404740	905322	1407174
22	10939	16539	330433	832024	1333366
23	10939	16539	254545	756747	1257174
24	10939	16539	180240	681470	1183361
25	10939	16539	105933	606189	1107170
26	10939	16539	30042	530912	1033357
27	10939	16539	22139	455634	957165
28	10939	16539	22139	380357	883357
29	10939	16539	22139	307059	807165
30	10939	16539	22139	231782	733352
32	10939	16539	22139	81224	583348
34	10939	16539	22139	27739	433348
36	10939	16539	22139	27739	283343
38	10939	16539	22139	27739	133339
40	10939	16539	22139	27739	33339
42	10939	16539	22139	27739	33339
44	10939	16539	22139	27739	33339
46	10939	16539	22139	27739	33339
48	10939	16539	22139	27739	33339
50	10939	16539	22139	27739	33339

USB :=

0
5
10
15
20

Plane\_Start(S12, USB, 1) =

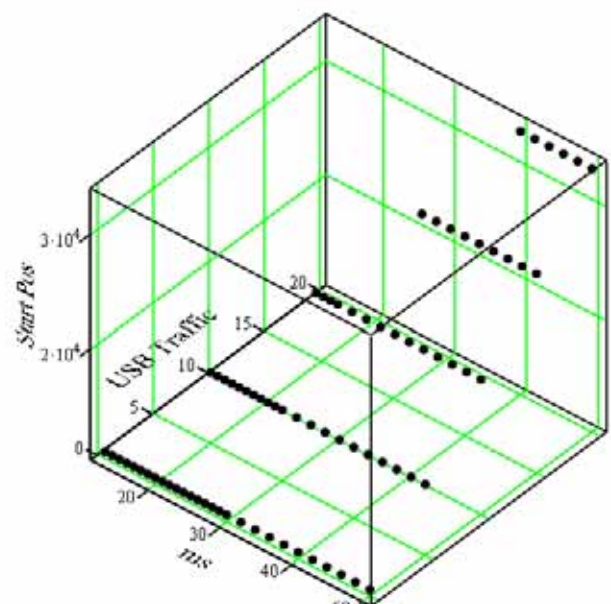
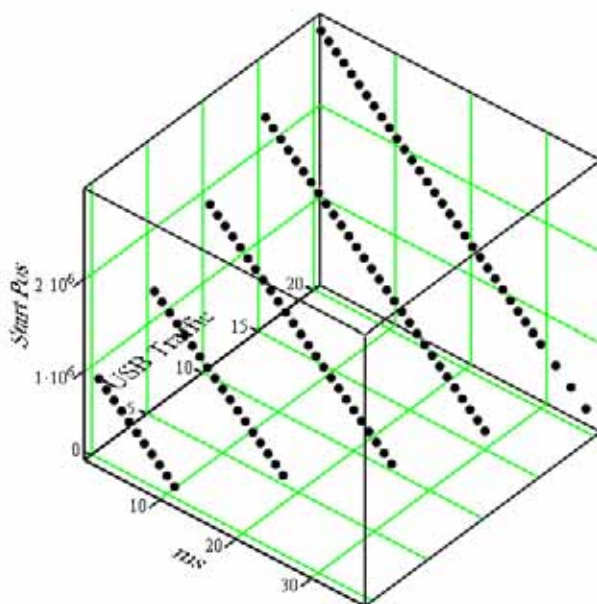
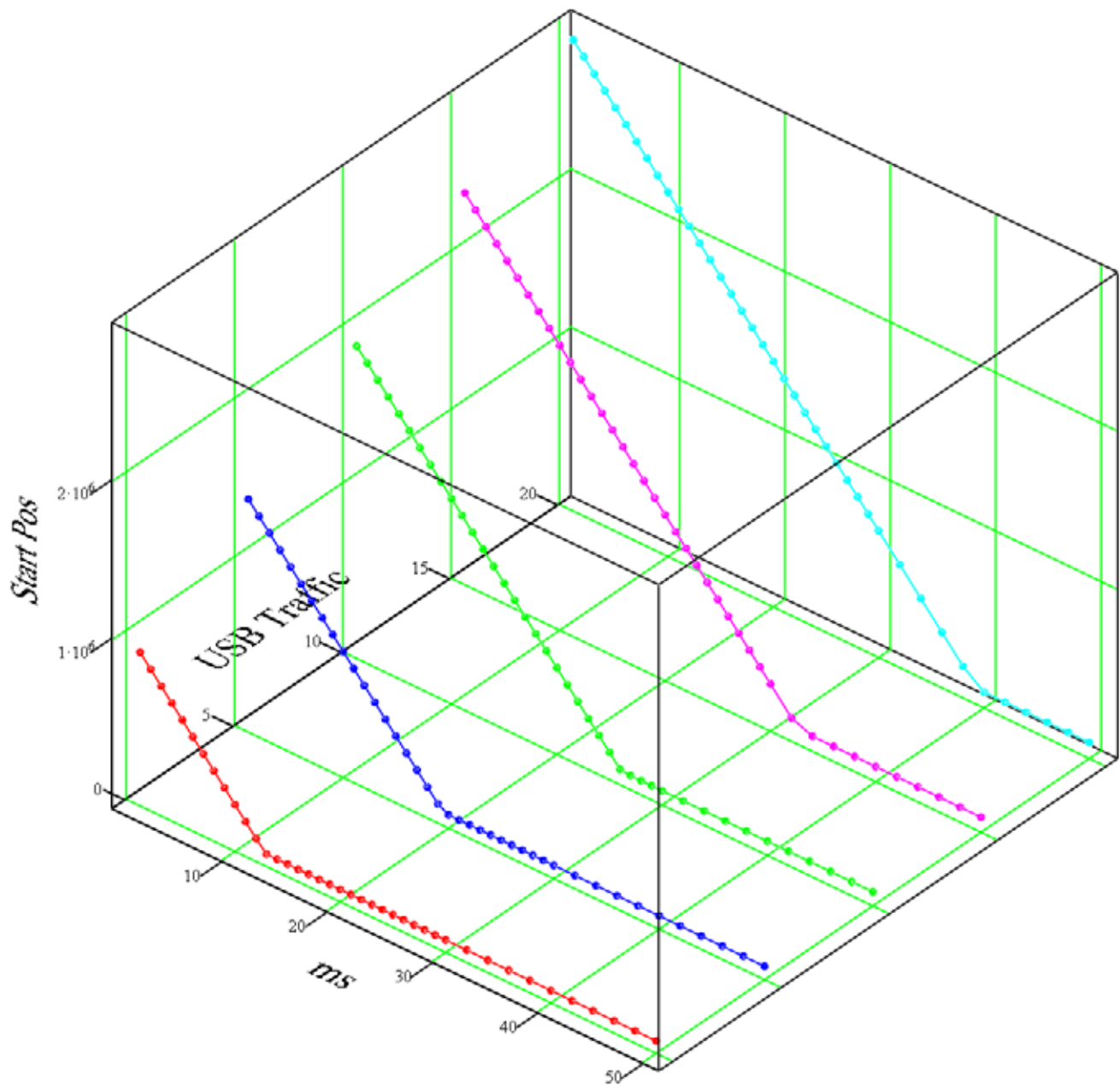
0
11
18
25
30
33

Plane\_Start(S12, USB, 2) =

	1	2	3
1	1	902839	0
2	2	827863	0
3	3	752888	0
4	4	677912	0
5	5	602937	0
6	6	527962	0
7	7	452985	0
8	8	378008	...

Plane\_Start(S12, USB, 0) =

-74975.955	-74999.227	-75000.178	-75000.342	-74989.304
977815.818	1478965.157	1980206.63	2481195.34	2982646.867
12.896	19.499	26.108	32.713	39.33



MONO16 1x1 1440x900

ms

(0 5 10 15 20) USB

S9 :=

1

671664

1054638

1437133

1820543

2202428

2

596690

979052

1362826

1745264

2128618

3

521713

904651

1286938

1669986

2052425

4

446736

829066

1212630

1594709

1978614

5

371760

754664

1136742

1519432

1902423

6

296783

679079

1062434

1444153

1828611

7

221809

605493

986551

1368874

1752419

8

146832

529092

912240

1295579

1678609

9

71857

454690

837932

1220298

1602419

10

10939

379105

762044

1145022

1528605

11

10939

304703

687738

1069745

1452414

12

10939

229119

611850

994467

1378602

13

10939

154714

537545

919186

1302410

14

10939

79131

461657

843909

1228600

15

10939

16539

387348

770614

1152407

16

10939

16539

311459

695333

1078596

17

10939

16539

237153

620057

1002405

18

10939

16539

162847

544780

928592

19

10939

16539

86959

469502

852401

20

10939

16539

22139

394221

778592

21

10939

16539

22139

318944

702398

22

10939

16539

22139

245649

628588

23

10939

16539

22139

170368

552396

24

10939

16539

22139

95092

478583

25

10939

16539

22139

27739

402392

26

10939

16539

22139

27739

328583

27

10939

16539

22139

27739

252389

28

10939

16539

22139

27739

178579

29

10939

16539

22139

27739

102387

30

10939

16539

22139

27739

33339

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10939

16539

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27739

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10939

16539

22139

27739

33339

48

10939

16539

22139

27739

33339

50

10939

16539

22139

27739

33339

Plane\_Start(S9, USB, 1) =

0

8

13

18

23

28

Plane\_Start(S9, USB, 2) =

	1	2	3
1	1	671664	0
2	2	596690	0
3	3	521713	0
4	4	446736	0
5	5	371760	0
6	6	296783	0
7	7	221809	...

Plane\_Start(S9, USB, 0) =

-74976.131

-74993.511

-75005.338

-75003.963

-74996.937

746640.964

1129421.192

1512276.66

1894857.779

2277959.079

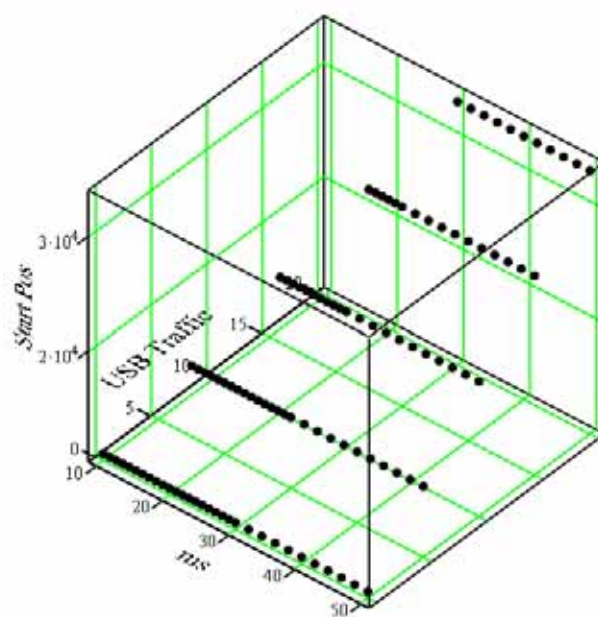
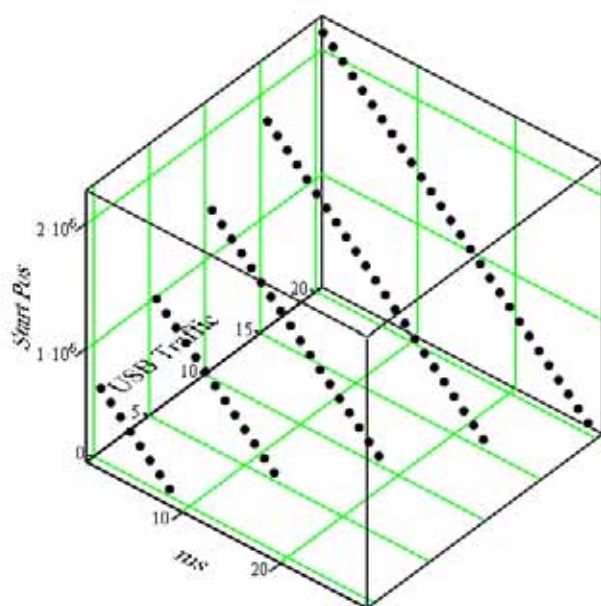
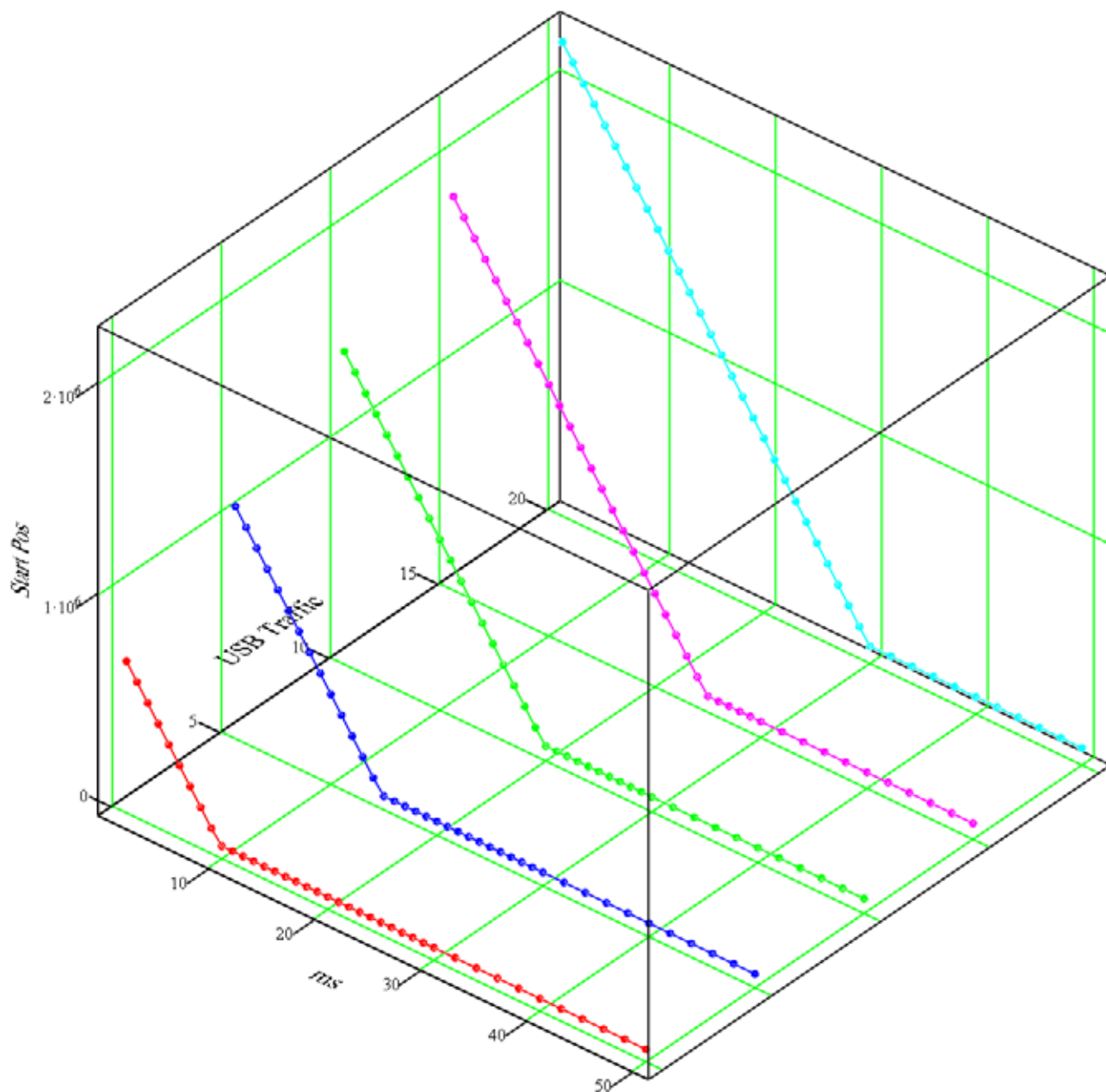
9.812

14.84

19.867

24.894

29.929



MONO16 1x1 800x600

ms

(0 5 10 15 20) USB

S6 :=

1

434240

695615

956511

1218318

1478605

2

359264

620030

882202

1143040

1404794

3

284288

545626

806314

1067764

1328603

4

209314

470043

732008

992483

1254790

5

134337

395638

656120

917206

1178599

6

59360

320057

581811

841929

1104790

7

10939

245651

505924

766652

1028595

8

10939

170066

431616

693353

954786

9

10939

98066

357311

618075

878591

10

10939

23066

281423

542799

804781

11

10939

16539

207114

467518

728591

12

10939

16539

131226

392241

654781

13

10939

16539

22139

316964

578586

14

10939

16539

22139

241687

504777

15

10939

16539

22139

168388

428584

16

10939

16539

22139

101016

354772

17

10939

16539

22139

27739

278582

18

10939

16539

22139

27739

204768

19

10939

16539

22139

27739

128577

20

10939

16539

22139

27739

62466

21

10939

16539

22139

27739

33339

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27739

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46

10939

16539

22139

27739

33339

48

10939

16539

22139

27739

33339

50

10939

16539

22139

27739

33339

Plane\_Start(S6, USB, 1) =

0

5

9

11

15

19

Plane\_Start(S6, USB, 2) =

	1	2	3
1	1	434240	0
2	2	359264	0
3	3	284288	0
4	4	209314	0
5	5	134337	0
6	1	695615	5
7	2	620030	...

Plane\_Start(S6, USB, 0) =

-74975.6

-74833.733

-74982.636

-75030.346

-75001.542

509215.4

769812.222

1031564.364

1292803.905

1554170.789

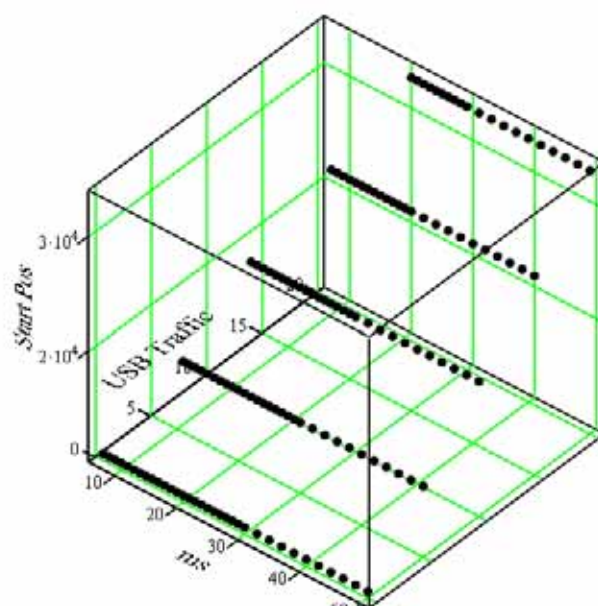
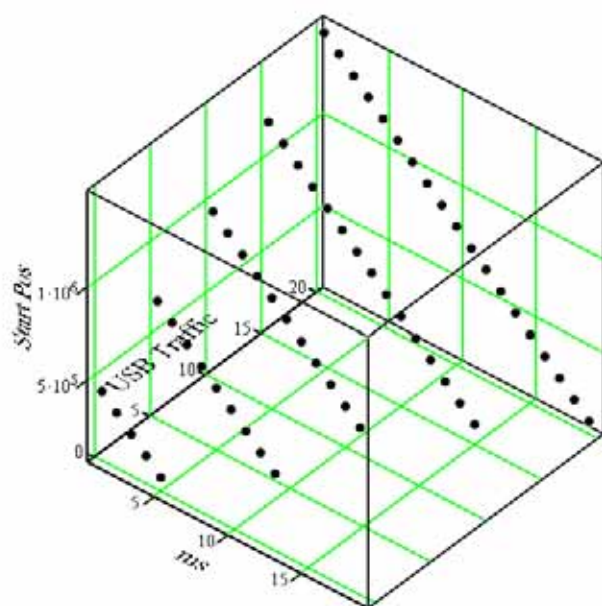
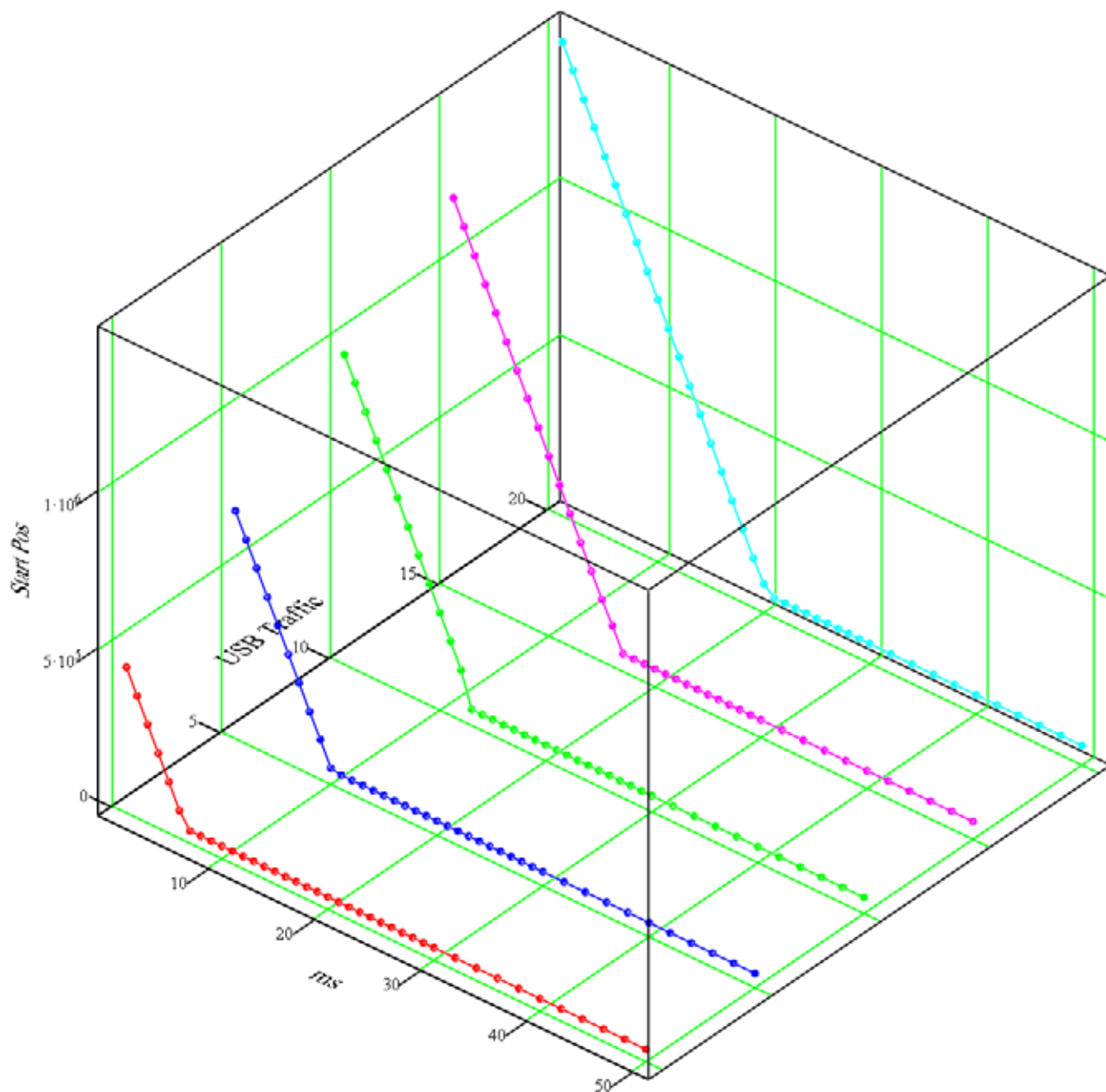
6.646

10.066

13.462

16.861

20.277





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

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

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

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

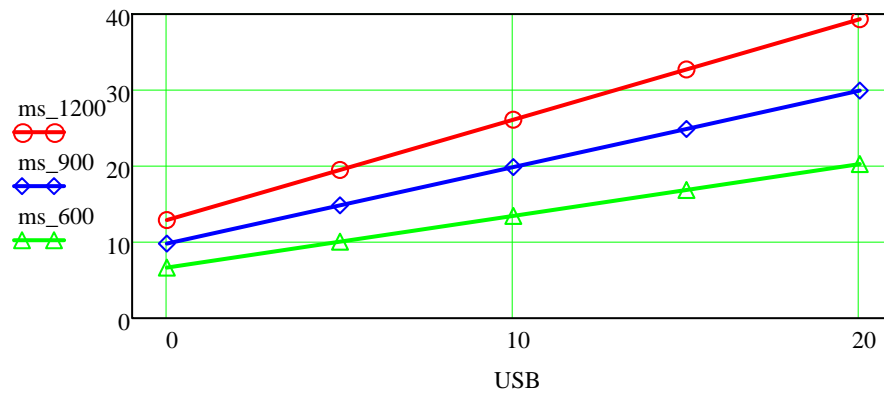
$$a9 := \text{neigung}(USB, ms_{900})$$

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

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

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

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



$$a12 = 1.322$$

$$b12 = 12.893$$

$$a9 = 1.006$$

$$b9 = 9.811$$

$$a6 = 0.681$$

$$b6 = 6.651$$

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

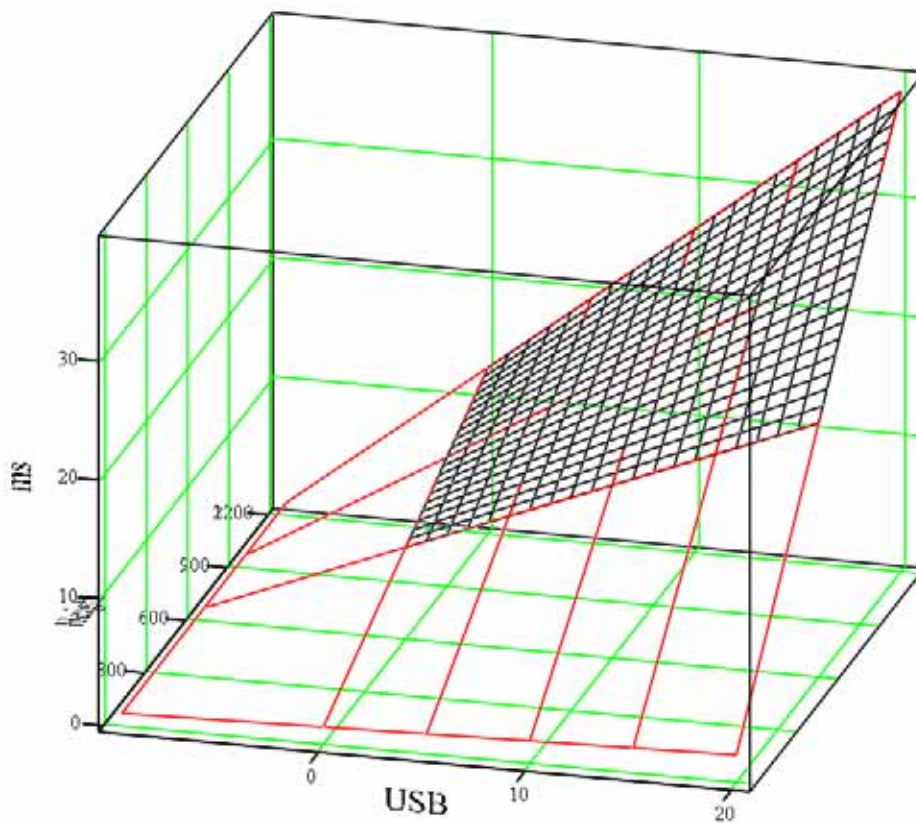
$$\frac{-b9}{a9} = -9.755$$

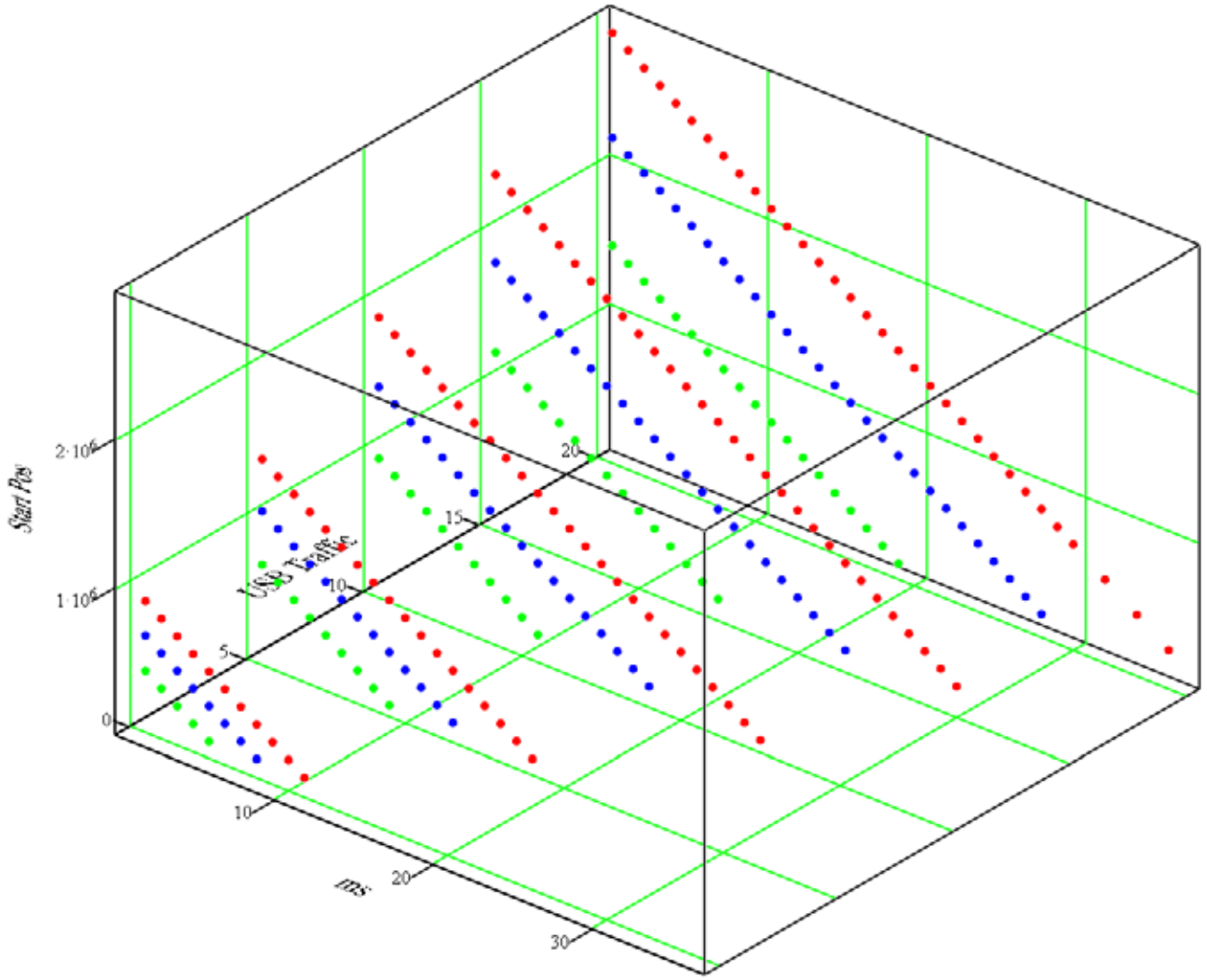
$$\frac{-b6}{a6} = -9.764$$

$$\text{neigung} \left[ \begin{pmatrix} 1200 \\ 900 \\ 600 \end{pmatrix}, \begin{pmatrix} a12 \\ a9 \\ a6 \end{pmatrix} \right] = 0.001067447482$$

$$\text{achsenabschn} \left[ \begin{pmatrix} 1200 \\ 900 \\ 600 \end{pmatrix}, \begin{pmatrix} a12 \\ a9 \\ a6 \end{pmatrix} \right] = 0.042142622291$$

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





$$M12 := \text{erweitern}(S\_L1^{\langle 1 \rangle}, S\_L1^{\langle 3 \rangle}, 0 \cdot S\_L1^{\langle 3 \rangle} + 1)$$

$$M9 := \text{erweitern}(S\_L2^{\langle 1 \rangle}, S\_L2^{\langle 3 \rangle}, 0 \cdot S\_L2^{\langle 3 \rangle} + 1)$$

$$M6 := \text{erweitern}(S\_L3^{\langle 1 \rangle}, S\_L3^{\langle 3 \rangle}, 0 \cdot S\_L3^{\langle 3 \rangle} + 1)$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} := (M12^T \cdot M12)^{-1} \cdot M12^T \cdot S\_L1^{\langle 2 \rangle}$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} = \begin{pmatrix} -74996.272 \\ 100242.66 \\ 977739.193 \end{pmatrix}$$

$$T12 := a12 \cdot S\_L1^{\langle 1 \rangle} + b12 \cdot S\_L1^{\langle 3 \rangle} + c12$$

$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} := (M9^T \cdot M9)^{-1} \cdot M9^T \cdot S\_L2^{\langle 2 \rangle}$$

$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} = \begin{pmatrix} -74999.667 \\ 76562.002 \\ 746613.602 \end{pmatrix}$$

$$T9 := a9 \cdot S\_L2^{\langle 1 \rangle} + b9 \cdot S\_L2^{\langle 3 \rangle} + c9$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} := (M6^T \cdot M6)^{-1} \cdot M6^T \cdot S\_L3^{\langle 2 \rangle}$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} = \begin{pmatrix} -74996.03 \\ 52233.953 \\ 509295.312 \end{pmatrix}$$

$$T6 := a6 \cdot S\_L3^{\langle 1 \rangle} + b6 \cdot S\_L3^{\langle 3 \rangle} + c6$$

$$M := \text{erweitern} \left[ \overrightarrow{\begin{pmatrix} 600 \\ 900 \\ 1200 \end{pmatrix}}^2, \begin{pmatrix} 600 \\ 900 \\ 1200 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \right]$$

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

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

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



$$K_a = \begin{pmatrix} 0.0000390615 \\ -0.0707123262 \\ -74967.6652077614 \end{pmatrix}$$

$$K_b = \begin{pmatrix} -0.0035966154 \\ 86.4884205021 \\ 1635.681760198 \end{pmatrix}$$

$$K_c = \begin{pmatrix} -0.0344038914 \\ 842.6668063012 \\ 16080.6286237356 \end{pmatrix}$$

$$K_a := \begin{pmatrix} 0.0000390615 \\ -0.0707123 \\ -74967.6652 \end{pmatrix}$$

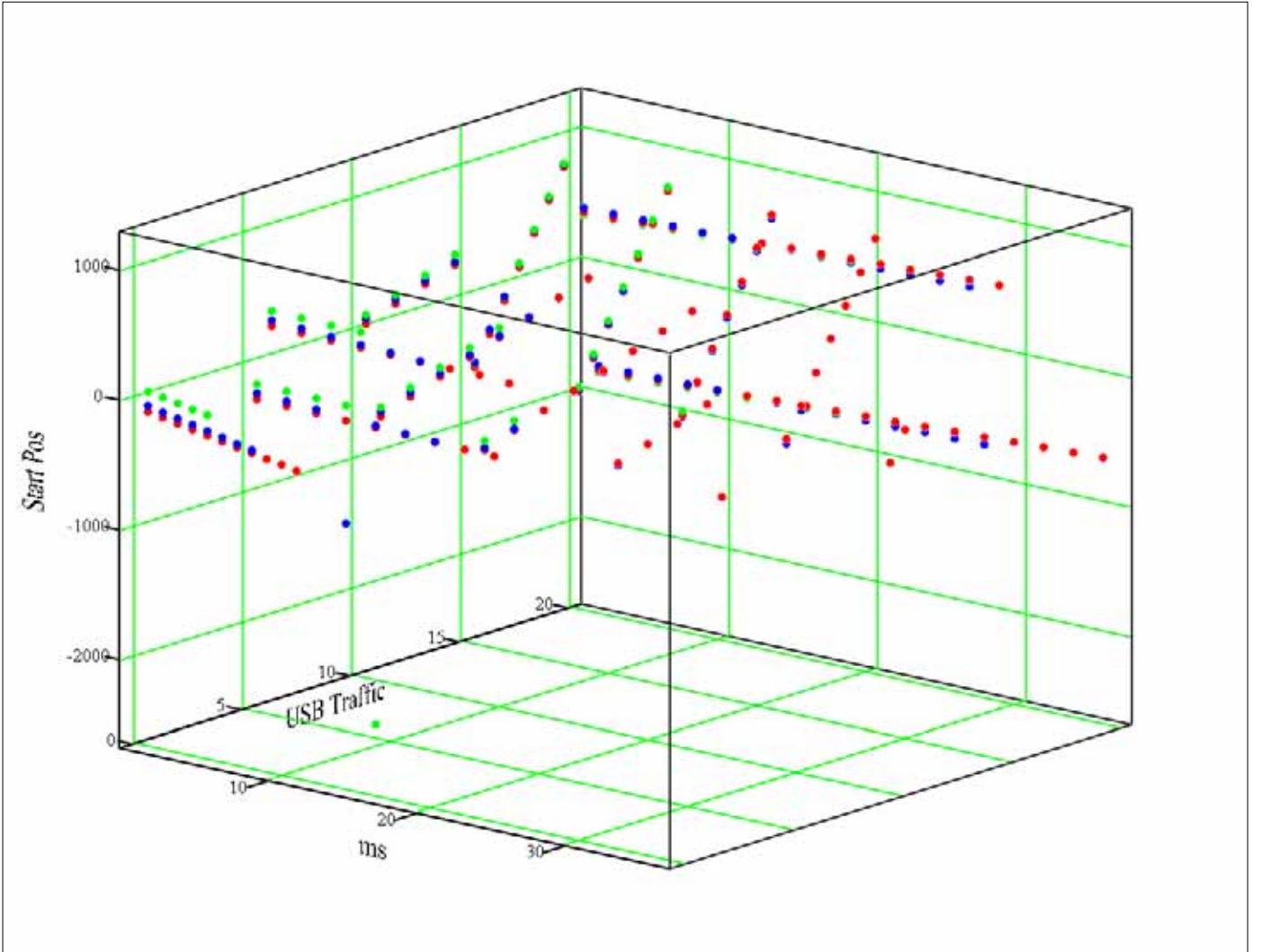
$$K_b := \begin{pmatrix} -0.0035966154 \\ 86.4884205 \\ 1635.68176 \end{pmatrix}$$

$$K_c := \begin{pmatrix} -0.0344038914 \\ 842.6668063 \\ 16080.628624 \end{pmatrix}$$

$$H := 1200 \quad SP_{12} := \left[ \left( K_{a1} \cdot H + K_{a2} \right) \cdot H + K_{a3} \right] \cdot S_{L1}^{\langle 1 \rangle} + \left[ \left( K_{b1} \cdot H + K_{b2} \right) \cdot H + K_{b3} \right] \cdot S_{L1}^{\langle 3 \rangle} + \left[ \left( K_{c1} \cdot H + K_{c2} \right) \cdot H + K_{c3} \right]$$

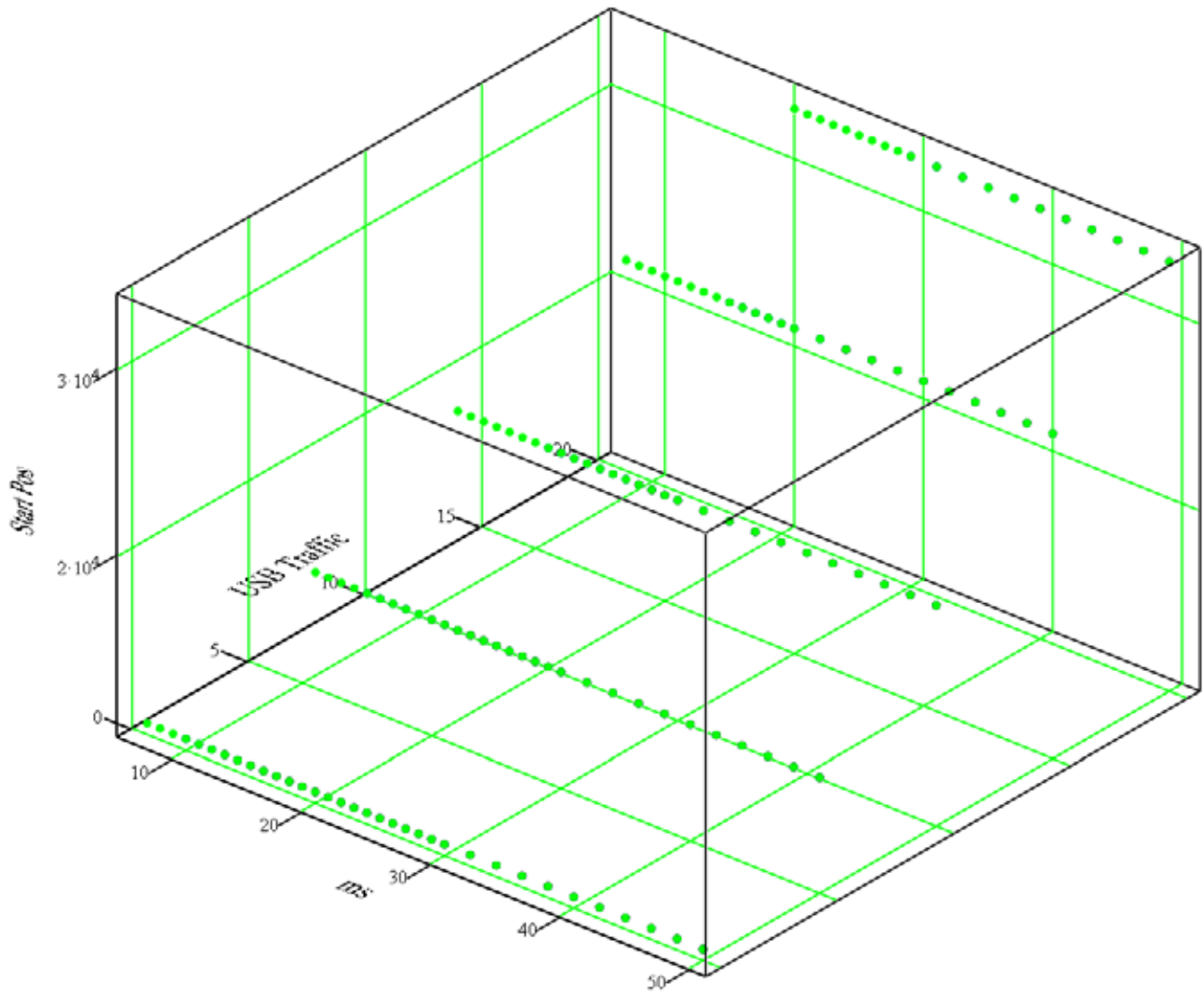
$$H := 900 \quad SP_9 := \left[ \left( K_{a1} \cdot H + K_{a2} \right) \cdot H + K_{a3} \right] \cdot S_{L2}^{\langle 1 \rangle} + \left[ \left( K_{b1} \cdot H + K_{b2} \right) \cdot H + K_{b3} \right] \cdot S_{L2}^{\langle 3 \rangle} + \left[ \left( K_{c1} \cdot H + K_{c2} \right) \cdot H + K_{c3} \right]$$

$$H := 600 \quad SP_6 := \left[ \left( K_{a1} \cdot H + K_{a2} \right) \cdot H + K_{a3} \right] \cdot S_{L3}^{\langle 1 \rangle} + \left[ \left( K_{b1} \cdot H + K_{b2} \right) \cdot H + K_{b3} \right] \cdot S_{L3}^{\langle 3 \rangle} + \left[ \left( K_{c1} \cdot H + K_{c2} \right) \cdot H + K_{c3} \right]$$



$$\left( S_{L1}^{\langle 1 \rangle}, S_{L1}^{\langle 3 \rangle}, SP_{12} - S_{L1}^{\langle 2 \rangle} \right), \left( S_{L2}^{\langle 1 \rangle}, S_{L2}^{\langle 3 \rangle}, SP_9 - S_{L2}^{\langle 2 \rangle} \right), \left( S_{L3}^{\langle 1 \rangle}, S_{L3}^{\langle 3 \rangle}, SP_6 - S_{L3}^{\langle 2 \rangle} \right)$$

$$\begin{aligned} & [(0.0000390615 \cdot H - 0.0707123) \cdot H - 74967.6652] \cdot ms + [(-0.0035966154 \cdot H + 86.4884205) \cdot H + 1635.68176] \cdot usb + \\ & (-0.0344038914 \cdot H + 842.6668063) \cdot H + 16080.628624 \end{aligned}$$



$$M12 := \text{erweitern}(S\_R1^{\langle 1 \rangle}, S\_R1^{\langle 3 \rangle}, 0 \cdot S\_R1^{\langle 3 \rangle} + 1)$$

$$M9 := \text{erweitern}(S\_R2^{\langle 1 \rangle}, S\_R2^{\langle 3 \rangle}, 0 \cdot S\_R2^{\langle 3 \rangle} + 1)$$

$$M6 := \text{erweitern}(S\_R3^{\langle 1 \rangle}, S\_R3^{\langle 3 \rangle}, 0 \cdot S\_R3^{\langle 3 \rangle} + 1)$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} := (M12^T \cdot M12)^{-1} \cdot M12^T \cdot S\_R1^{\langle 2 \rangle}$$

$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} := (M9^T \cdot M9)^{-1} \cdot M9^T \cdot S\_R2^{\langle 2 \rangle}$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} := (M6^T \cdot M6)^{-1} \cdot M6^T \cdot S\_R3^{\langle 2 \rangle}$$

$$\begin{pmatrix} a12 \\ b12 \\ c12 \end{pmatrix} = \begin{pmatrix} 0 \\ 1120 \\ 10939 \end{pmatrix}$$

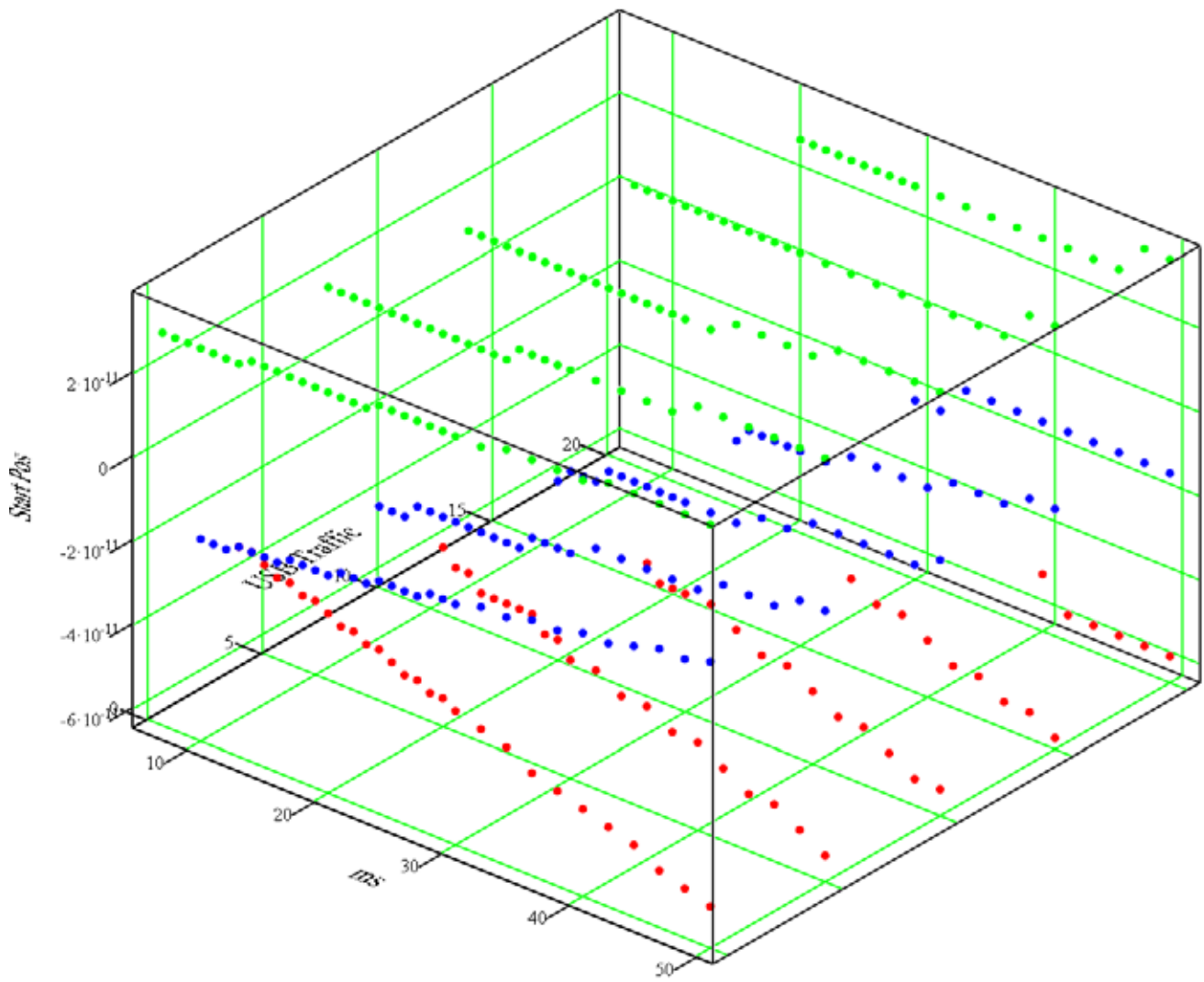
$$\begin{pmatrix} a9 \\ b9 \\ c9 \end{pmatrix} = \begin{pmatrix} -0 \\ 1120 \\ 10939 \end{pmatrix}$$

$$\begin{pmatrix} a6 \\ b6 \\ c6 \end{pmatrix} = \begin{pmatrix} -0 \\ 1120 \\ 10939 \end{pmatrix}$$

$$T12 := a12 \cdot S\_R1^{\langle 1 \rangle} + b12 \cdot S\_R1^{\langle 3 \rangle} + c12$$

$$T9 := a9 \cdot S\_R2^{\langle 1 \rangle} + b9 \cdot S\_R2^{\langle 3 \rangle} + c9$$

$$T6 := a6 \cdot S\_R3^{\langle 1 \rangle} + b6 \cdot S\_R3^{\langle 3 \rangle} + c6$$



$$\left( S_{R1}^{\langle 1 \rangle}, S_{R1}^{\langle 3 \rangle}, S_{R1}^{\langle 2 \rangle} - T_{12} \right), \left( S_{R2}^{\langle 1 \rangle}, S_{R2}^{\langle 3 \rangle}, S_{R2}^{\langle 2 \rangle} - T_9 \right), \left( S_{R3}^{\langle 1 \rangle}, S_{R3}^{\langle 3 \rangle}, S_{R3}^{\langle 2 \rangle} - T_6 \right)$$

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

#### Time shorter than Time limit

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

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

#### Time longer than Time limit

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