

Kvantitativ analyse

MUS2006 Musikk og bevegelse
V2015

Kvalitativ / Kvantitativ

?

Kvalitativ / Kvantitativ

- Kvalitativ bevegelsesanalyse:
 - Beskrivelse av kvaliteter i bevegelsen
 - Hvilken funksjon har bevegelsen / hva kommuniserer den?
- Tolkning:
 - Musialsk kontekst (sjanger, rytme, harmonikk, instrument)
 - Annen kontekst (scene, forventninger, politikk...)

Kvalitativ / Kvantitativ

- Kvantitativ bevegelsesanalyse:
 - Kvalitativ analyse av kvantitative data
(er dette egentlig kvantitativ bevegelsesanalyse?)
 - Kvantitativ analyse av kvantitative data
(statistisk analyse)
- Vi skal fokusere på den første varianten

Kvantitative data

- Målbare / kvantifiserte data. F.eks:
- Posisjon / hastighet / akselerasjon
- Bevegelsesmengde: Quantity of motion
- Bevegelsessentrum
- Bevegelsesområde
- Målt muskelkraft
- Målt elektrodermal aktivitet

Kvalitativ analyse



- Entrainment / tiltrekningsbevegelser
- Rotasjonsbevegelser: hovedsaklig side til side med noe vertikal bevegelse
- Mekanisk, repetativ, ...
- Synkroniserer til fjerdedeler / åttedeler

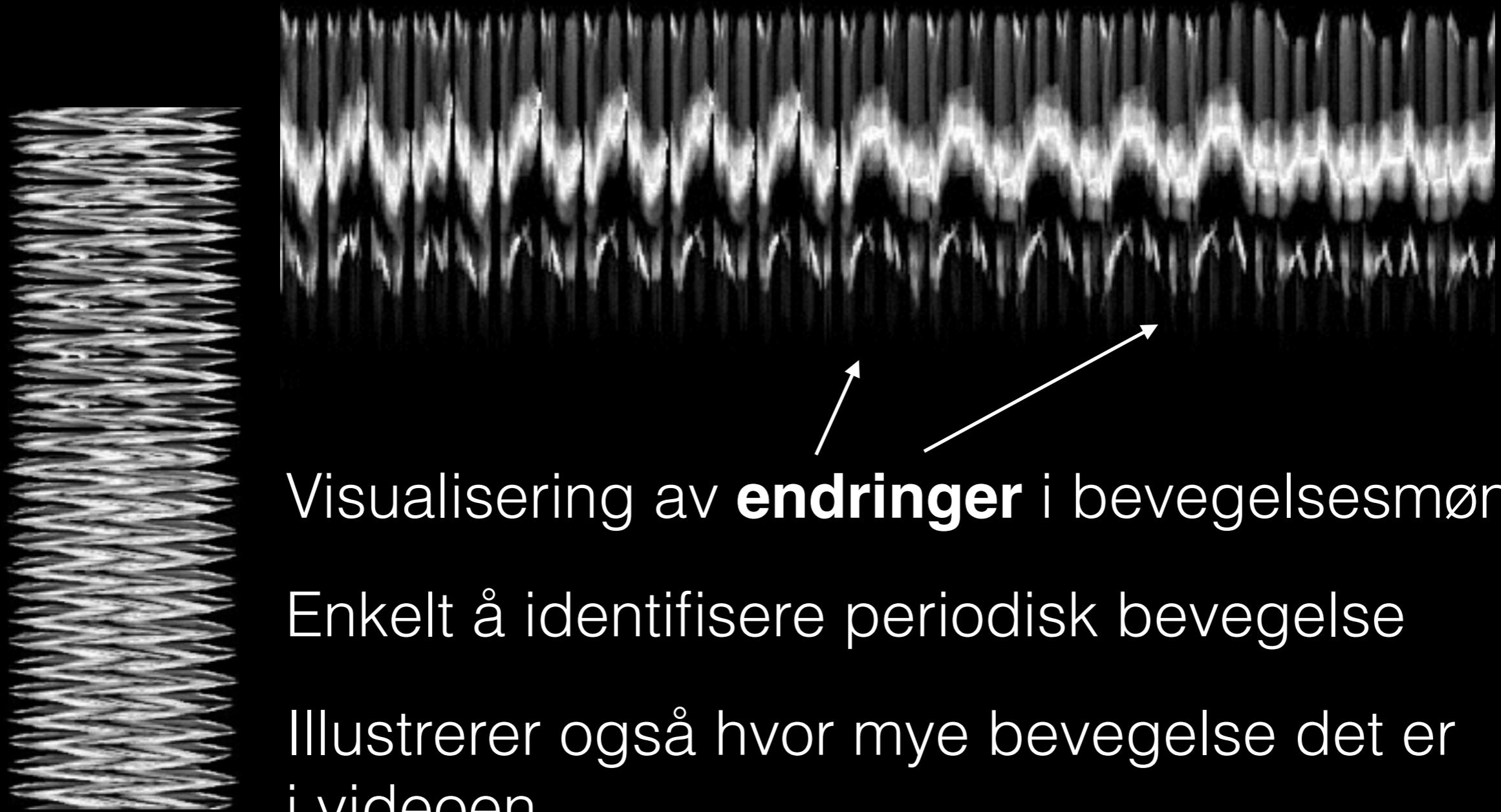
Kvalitativ analyse

The screenshot displays the VideoAnalysis software interface. The main window, titled "VideoAnalysis", shows a video of a yellow chick on a pedestal. Below the video, there are several analysis windows and controls:

- Top Left:** "open file" and "open folder" buttons, a "Current folder:" field, and a "Current file: keepon.mov" field.
- Top Right:** A "START" button with a red indicator light.
- Bottom Left:** A "play" button, a "click and drag to crop" instruction, and a "Length of median filter" slider set to 4.
- Bottom Center:** A "Noise reduction threshold" slider set to 0.18 and a "choose mode" dropdown menu.
- Bottom Right:** Three motion analysis graphs: "Quantity of motion (0. - 0.2)", "X position (0 - 320)", and "Y position (0 - 240)".
- Bottom Left (Lower):** A window showing a binary mask of the chick.
- Bottom Right (Lower):** A window showing a motion analysis graph with multiple overlapping curves.
- Bottom Left (Lower):** A window showing a motion analysis graph with multiple overlapping curves.

Two red arrows point from the text "bevegelseskurver" to the motion analysis graphs in the bottom right and bottom left windows.

Bevegelseskurve / motiongram

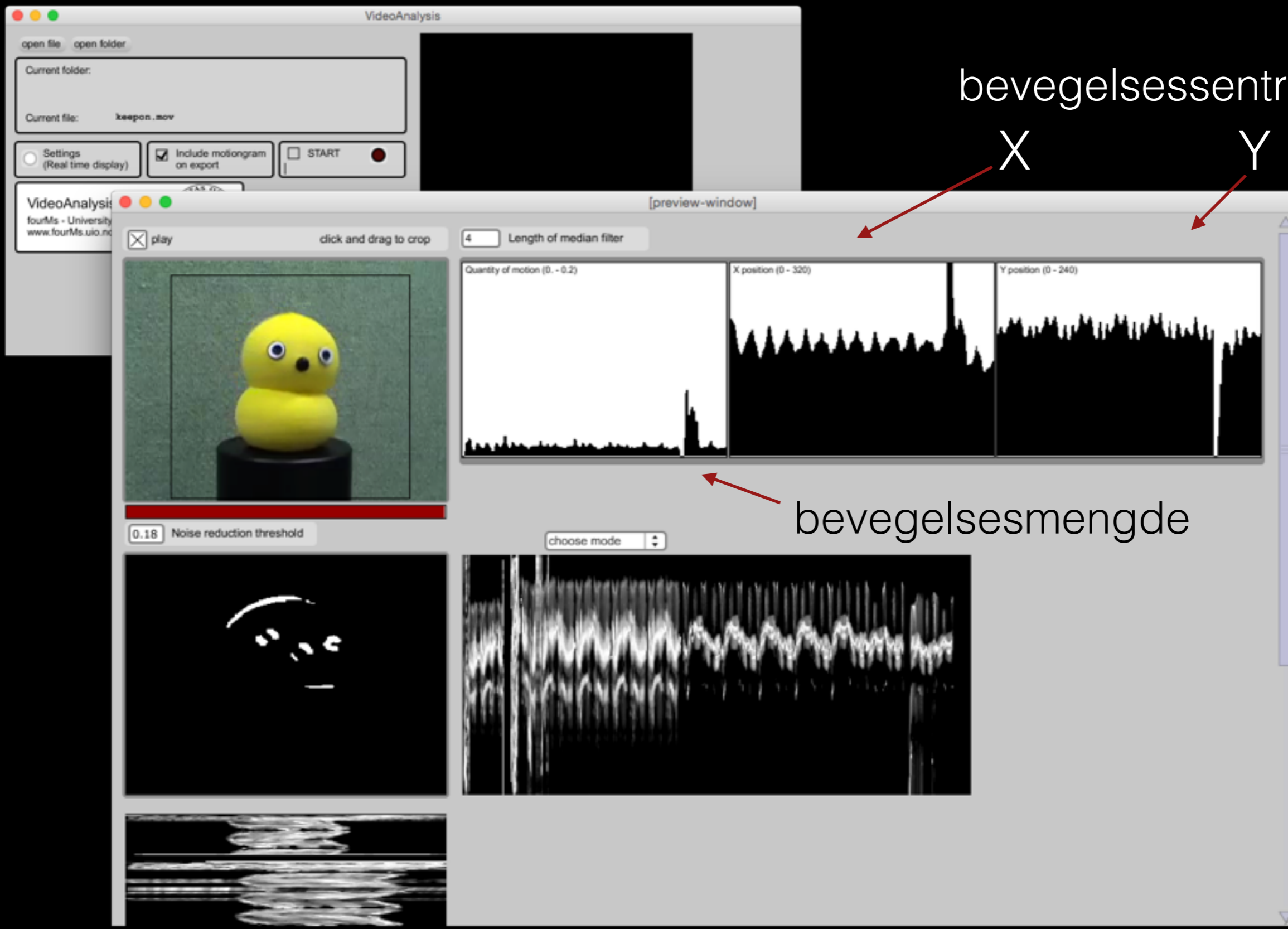


Visualisering av **endringer** i bevegelsesmønsteret

Enkelt å identifisere periodisk bevegelse

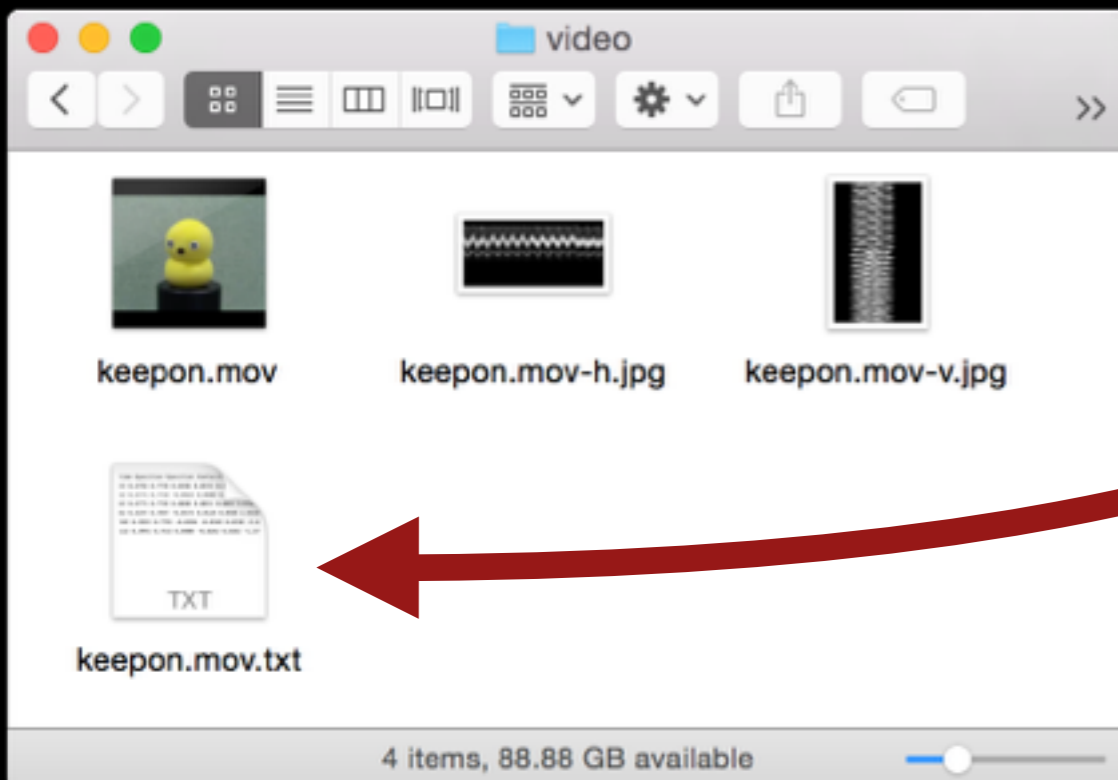
Illustrerer også hvor mye bevegelse det er i videoen

Kvantitative data fra videoanalysis



Kvantitative data fra videoanalysis

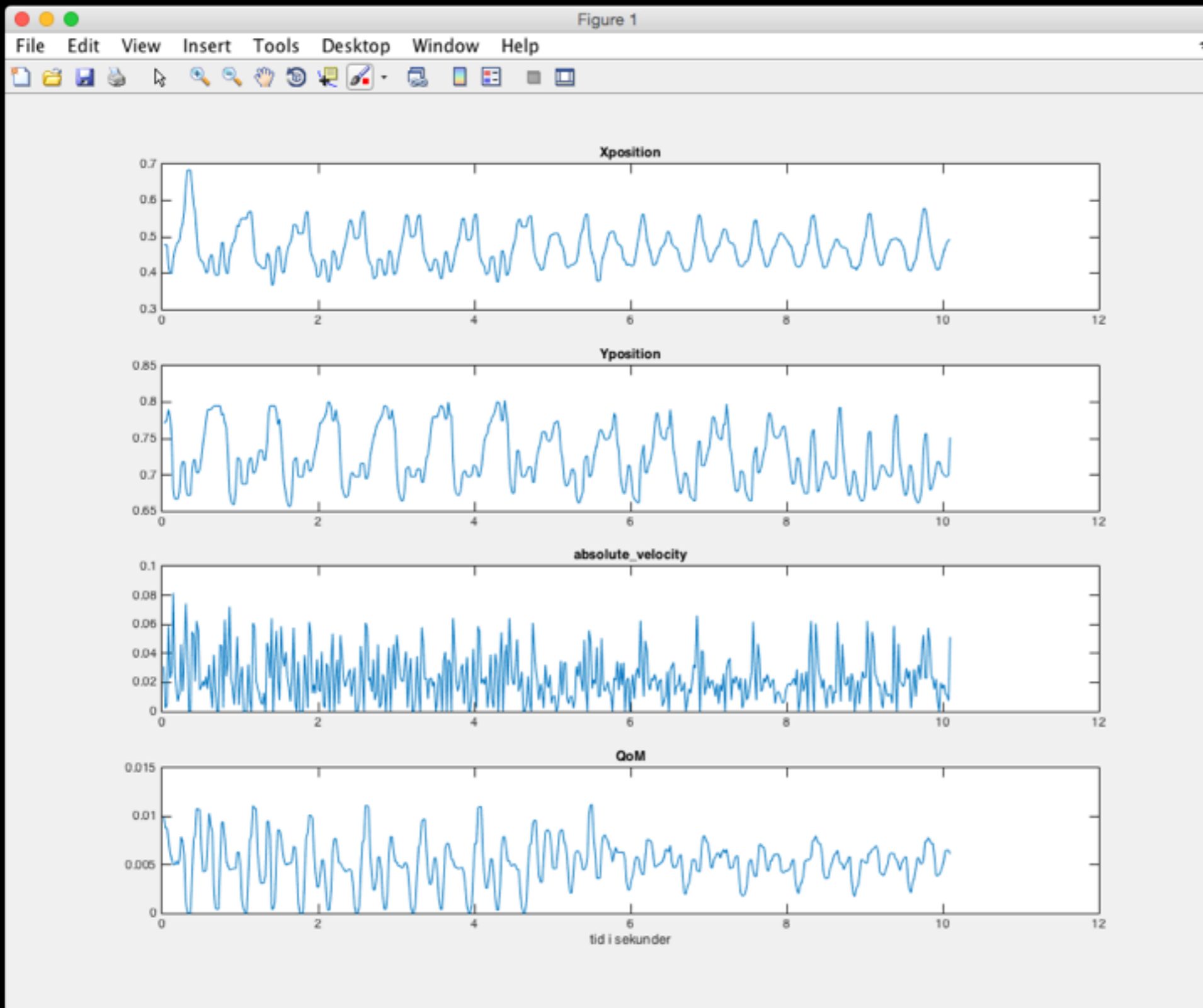
Programmet "Videoanalysis" lager en tekstfil:



1	time	Xposition	Yposition	Xvelocity	Yvelocity	absolute_velocity	direction	change_in_absolute_velocity	change_in_direction	QoM	Xposition_raw	Yposition_raw	Xvelocity_raw	Yvelocity_raw	absolute_velocity_raw	direction_raw	change_in_absolute_velocity_raw	change_in_direction_raw	QoM_raw
2	22	0.4794	0.0000	0.0206	0.0231	0.0310	0.0410	0.0172	1.4319	0.0099	0.4862	0.7641	-0.0138	-0.0256	0.0291	-2.0634	-0.0496	-2.1941	0.0102
3	42	0.4794	0.0000	-0.0023	0.0000	0.0023	3.1416	-0.0287	2.3006	0.0088	0.4679	0.7436	-0.0183	-0.0205	0.0275	-2.3006	-0.0016	-0.2372	0.0080
4	62	0.4794	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	82	0.4197	0.7897	-0.0573	0.0128	0.0588	2.9216	0.0536	1.3508	0.0076	0.2982	0.8410	-0.0734	0.0256	0.0777	2.8055	-0.0424	0.3044	0.0020
6	102	0.3991	0.7795	-0.0206	-0.0103	0.0230	-2.6805	-0.0357	-5.6021	0.0062	0.4266	0.6872	0.1284	-0.1538	0.2004	-0.8752	0.1227	-3.6806	0.0052
7	122	0.3991	0.7513	0.0000	-0.0282	0.0282	-1.5708	0.0052	1.1097	0.0056	0.4495	0.6718	0.0229	-0.0154	0.0276	-0.5908	-0.1728	0.2043	0.0061
8	142	0.4381	0.6795	0.0390	-0.0718	0.0817	-1.0733	0.0535	0.4975	0.0050	0.4725	0.6615	0.0229	-0.0103	0.0251	-0.4205	-0.0025	0.1703	0.0048
9	162	0.4610	0.6667	0.0229	-0.0128	0.0263	-0.5097	-0.0554	0.5636	0.0050	0.4817	0.6615	0.0092	0.0000	0.0092	0.0000	-0.0160	0.4205	0.0033
10	182	0.4771	0.6667	0.0161	0.0000	0.0161	0.0000	-0.0102	0.5097	0.0054	0.4954	0.6718	0.0138	0.0103	0.0172	0.6405	0.0080	0.6405	0.0059
11	202	0.4839	0.6667	0.0069	0.0000	0.0069	0.0000	-0.0092	0.0000	0.0050	0.4862	0.6821	-0.0092	0.0103	0.0138	2.3006	-0.0034	1.6601	0.0051
12	222	0.4908	0.6769	0.0069	0.0103	0.0124	0.9799	0.0055	0.9799	0.0055	0.5505	0.7385	0.0642	0.0564	0.0855	0.7207	0.0717	-1.5798	0.0104
13	243	0.5229	0.7103	0.0321	0.0333	0.0463	0.8041	0.0339	-0.1758	0.0079	0.5917	0.7846	0.0413	0.0462	0.0619	0.8410	-0.0236	0.1203	0.0098
14	263	0.5344	0.7179	0.0115	0.0077	0.0138	0.5908	-0.0325	-0.2133	0.0074	0.5183	0.6974	-0.0734	-0.0872	0.1140	-2.2706	0.0520	-3.1116	0.0023
15	283	0.5711	0.7179	0.0367	0.0000	0.0367	0.0000	0.0229	-0.5908	0.0060	0.6835	0.6718	0.1651	-0.0256	0.1671	-0.1540	0.0532	2.1165	0.0001
16	303	0.6376	0.6846	0.0665	-0.0333	0.0744	-0.4646	0.0377	-0.4646	0.0012	0.6835	0.6718	0.0000	0.0000	0.0000	0.0000	-0.1671	0.1540	0.0000
17	323	0.6835	0.6718	0.0459	-0.0128	0.0476	-0.2725	-0.0268	0.1920	0.0001	0.6835	0.6718	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18	343	0.6835	0.6718	0.0000	0.0000	0.0000	0.0000	-0.0476	0.2725	0.0000	0.6835	0.6718	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
19	363	0.6835	0.6718	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5963	0.7795	-0.0872	0.1077	0.1385	2.2512	0.1385	2.2512	0.0083
20	383	0.6399	0.7051	-0.0436	0.0333	0.0549	2.4886	0.0549	2.4886	0.0038	0.5826	0.7385	-0.0138	-0.0410	0.0433	-1.8944	-0.0953	-4.1456	0.0077
21	403	0.5894	0.7205	-0.0505	0.0154	0.0528	2.8456	-0.0021	0.3570	0.0076	0.5550	0.7026	-0.0275	-0.0359	0.0452	-2.2249	0.0020	-0.3305	0.0076
22	423	0.5688	0.7205	-0.0206	0.0000	0.0206	3.1416	-0.0321	0.2959	0.0080	0.4633	0.7026	-0.0917	0.0000	0.0917	3.1416	0.0465	5.3665	0.0155
23	443	0.5092	0.7026	-0.0596	-0.0179	0.0623	-2.8492	0.0416	-5.9908	0.0108	0.4450	0.6923	-0.0183	-0.0103	0.0210	-2.6319	-0.0707	-5.7735	0.0130
24	463	0.4541	0.7026	-0.0550	0.0000	0.0550	3.1416	-0.0072	5.9908	0.0107	0.4358	0.7128	-0.0092	0.0205	0.0225	1.9914	0.0015	4.6232	0.0076
25	483	0.4404	0.7077	-0.0138	0.0051	0.0147	2.7849	-0.0404	-0.3567	0.0107	0.4266	0.7333	-0.0092	0.0205	0.0225	1.9914	0.0000	0.0000	0.0057
26	503	0.4335	0.7231	-0.0069	0.0154	0.0169	1.9914	-0.0022	-0.7935	0.0066	0.4312	0.7538	0.0046	0.0205	0.0210	1.3508	-0.0015	-0.6406	0.0028
27	523	0.4289	0.7436	-0.0046	0.0205	0.0210	1.7908	0.0042	-0.2006	0.0043	0.4083	0.7590	-0.0229	0.0051	0.0235	2.9216	0.0025	1.5708	0.0018
28	543	0.4174	0.7564	-0.0115	0.0128	0.0172	2.3006	-0.0038	0.5098	0.0043	0.3899	0.7897	-0.0183	0.0308	0.0358	2.1085	0.0123	-0.8131	0.0083
29	563	0.4014	0.7744	-0.0161	0.0179	0.0241	2.3006	0.0069	-0.0000	0.0044	0.3945	0.7897	0.0046	0.0000	0.0046	0.0000	-0.0312	-2.1085	0.0060
30	583	0.4014	0.7897	0.0000	0.0154	0.0154	1.5708	-0.0087	-0.7298	0.0071	0.4725	0.7897	0.0780	0.0000	0.0780	0.0000	0.0734	0.0000	0.0122
31	603	0.4335	0.7897	0.0321	0.0000	0.0321	0.0000	0.0167	-1.5708	0.0103	0.5000	0.8051	0.0275	0.0154	0.0315	0.5097	-0.0465	0.5097	0.0139
32	623	0.4495	0.7897	0.0161	0.0000	0.0161	0.0000	-0.0161	0.0000	0.0091	0.4266	0.7744	-0.0734	-0.0308	0.0796	-2.7446	0.0481	-3.2543	0.0045
33	643	0.4495	0.7923	0.0000	0.0026	0.0026	1.5708	-0.0135	1.5708	0.0084	0.3945	0.7949	-0.0321	0.0205	0.0381	2.5731	-0.0415	5.3177	0.0009
34	663	0.4106	0.7949	-0.0390	0.0026	0.0391	3.0759	0.0365	1.5051	0.0027	0.3945	0.7949	0.0000	0.0000	0.0000	0.0000	-0.0381	-2.5731	0.0000
35	683	0.3945	0.7949	-0.0161	0.0000	0.0161	3.1416	-0.0230	0.0657	0.0005	0.3945	0.7949	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
36	703	0.3945	0.7949	0.0000	0.0000	0.0000	0.0000	-0.0161	-3.1416	0.0004	0.3761	0.7949	-0.0183	0.0000	0.0183	3.1416	0.0183	3.1416	0.0009
37	723	0.3945	0.7949	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.5000	0.8000	0.1239	0.0051	0.1240	0.0414	0.1056	-3.1002	0.0106
38	743	0.4404	0.7949	0.0459	0.0000	0.0459	0.0000	0.0459	0.0000	0.0053	0.4862	0.7692	-0.0138	-0.0308	0.0337	-1.9914	-0.0903	-2.0327	0.0097
39	763	0.4839	0.7821	0.0436	-0.0128	0.0454	-0.2861	-0.0004	-0.2861	0.0094	0.4817	0.7538	-0.0046	-0.0154	0.0161	-1.8606	-0.0177	0.1308	0.0091
40	783	0.4839	0.7846	0.0000	0.0026	0.0026	1.5708	-0.0429	1.8569	0.0094	0.3624	0.8051	-0.1193	0.0513	0.1298	2.7355	0.1138	4.5961	0.0064

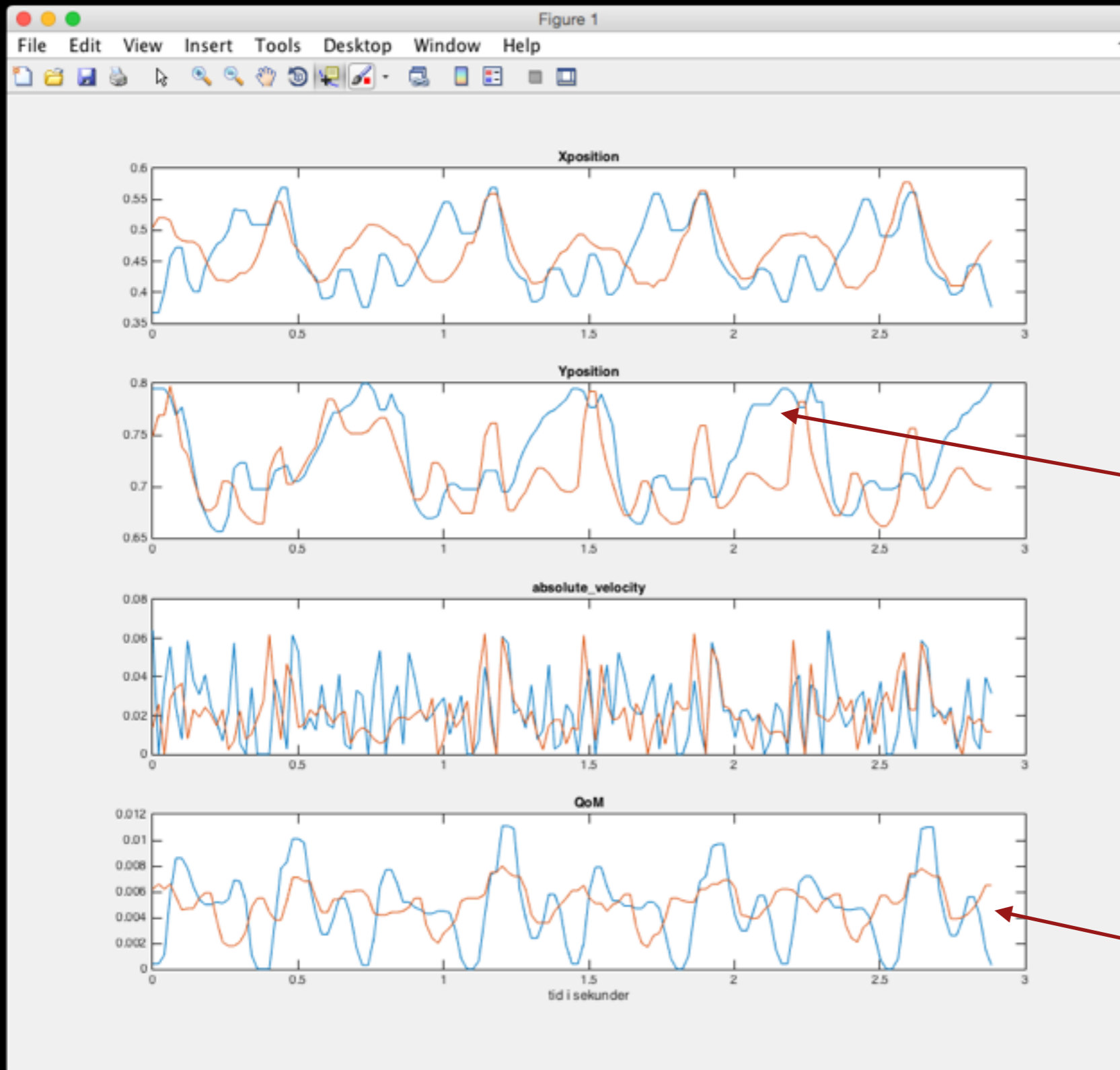
Tekstfilen kan åpnes f.eks. i Excel, OpenOffice, Matlab, eller andre programmer for å lage en graf

Kvalitativ analyse av kvantitative data



Dataene fra
videoanalysis-
programmet

Kvalitativ analyse av kvantitative data



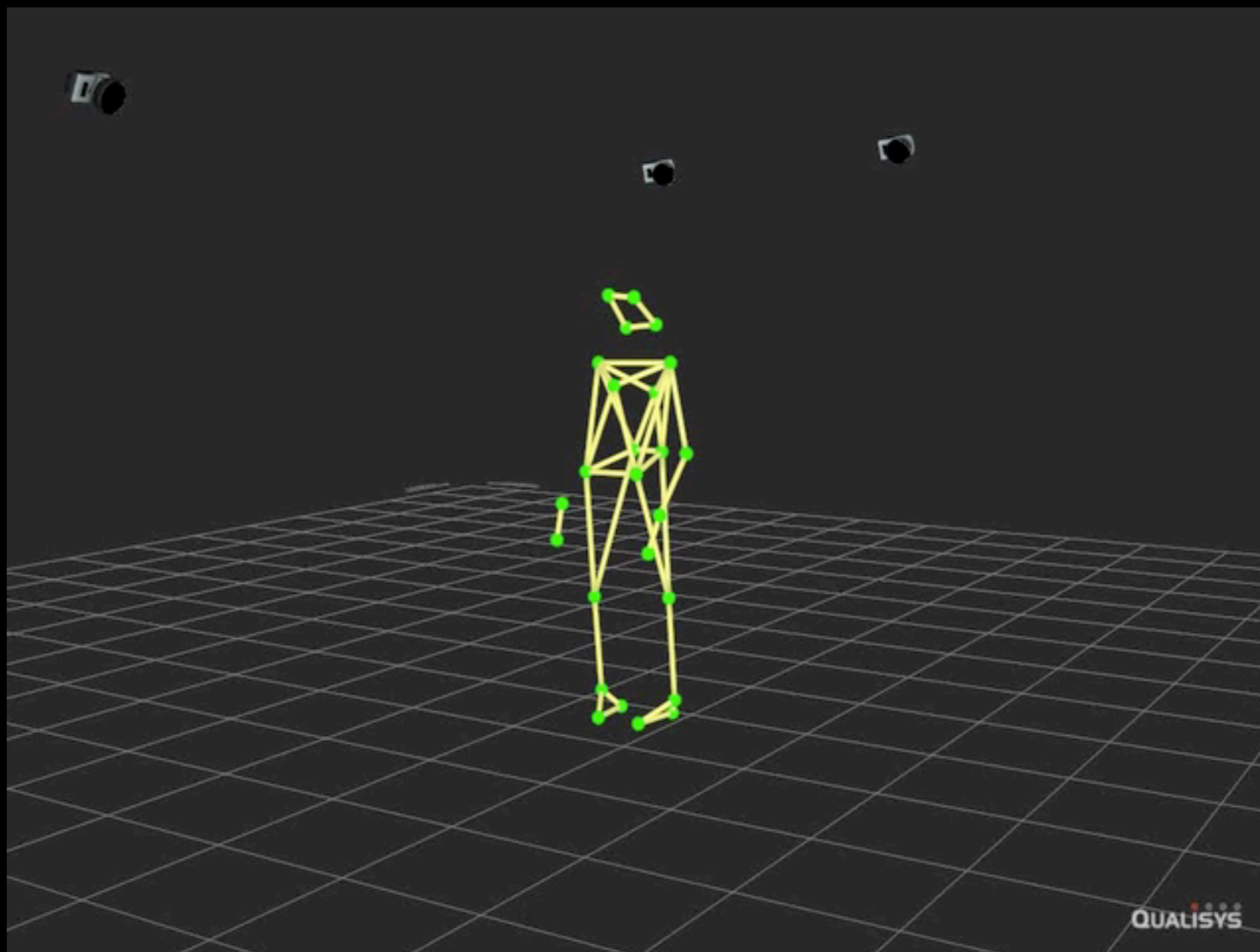
Sammenlikning av bevegelsesmønstre

Bevegelsen holder seg lengre i øvre posisjon i den blå grafen

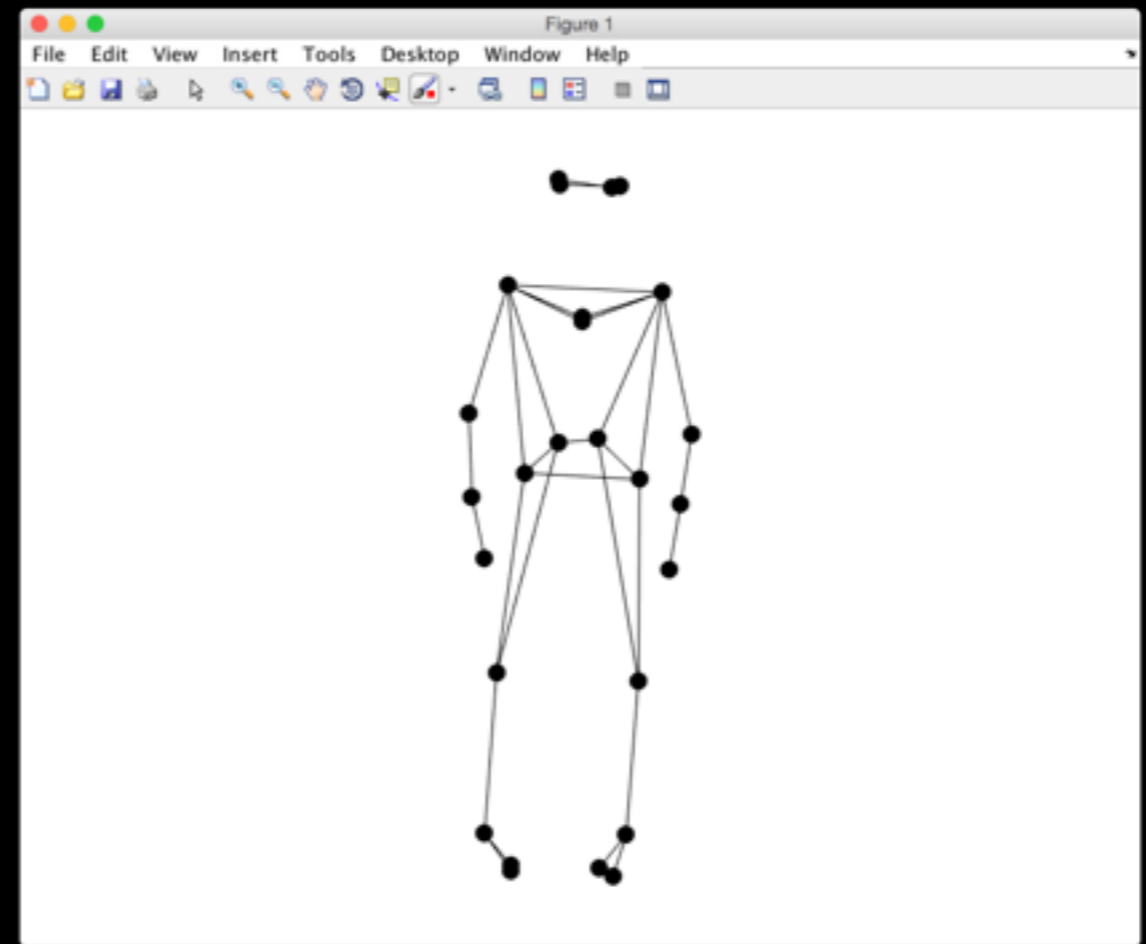
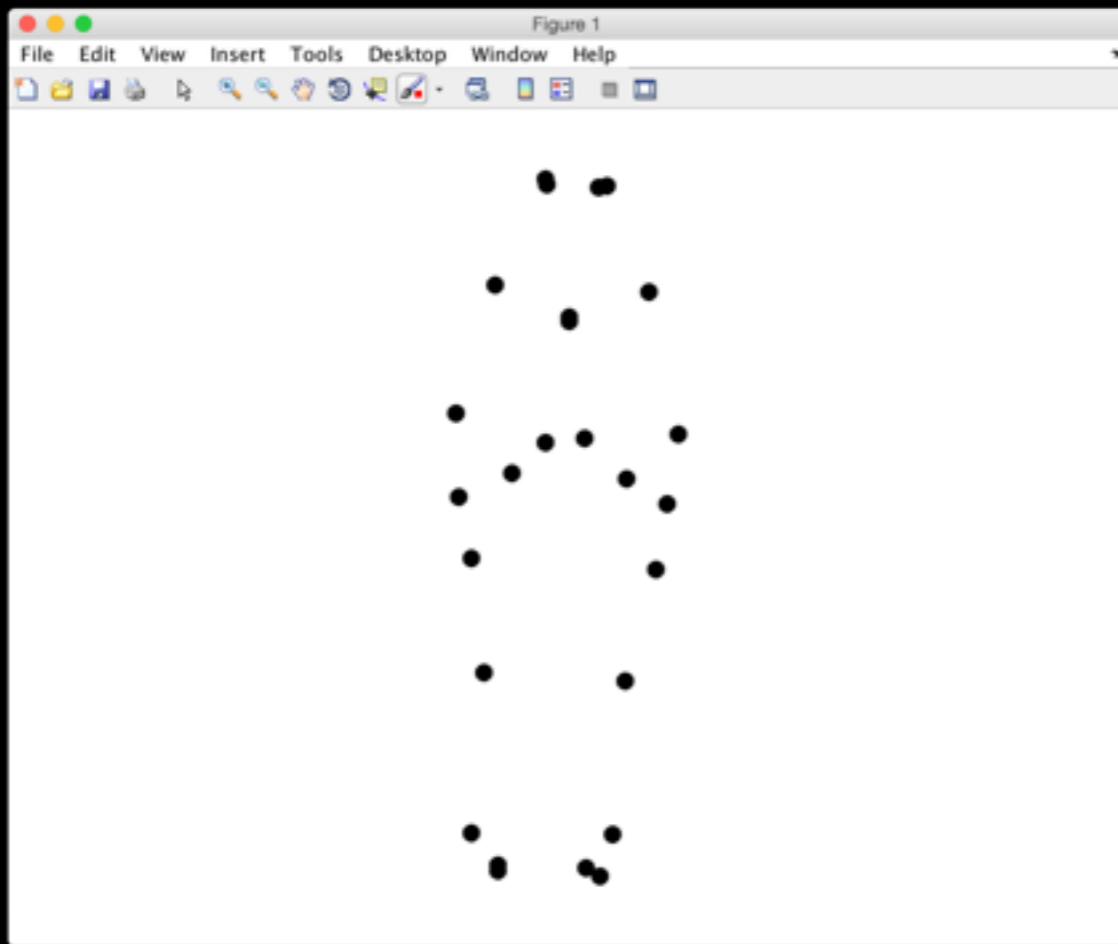
Bevegelsesmengde er jevnere i den røde grafen

Forsøket til oppgave 3

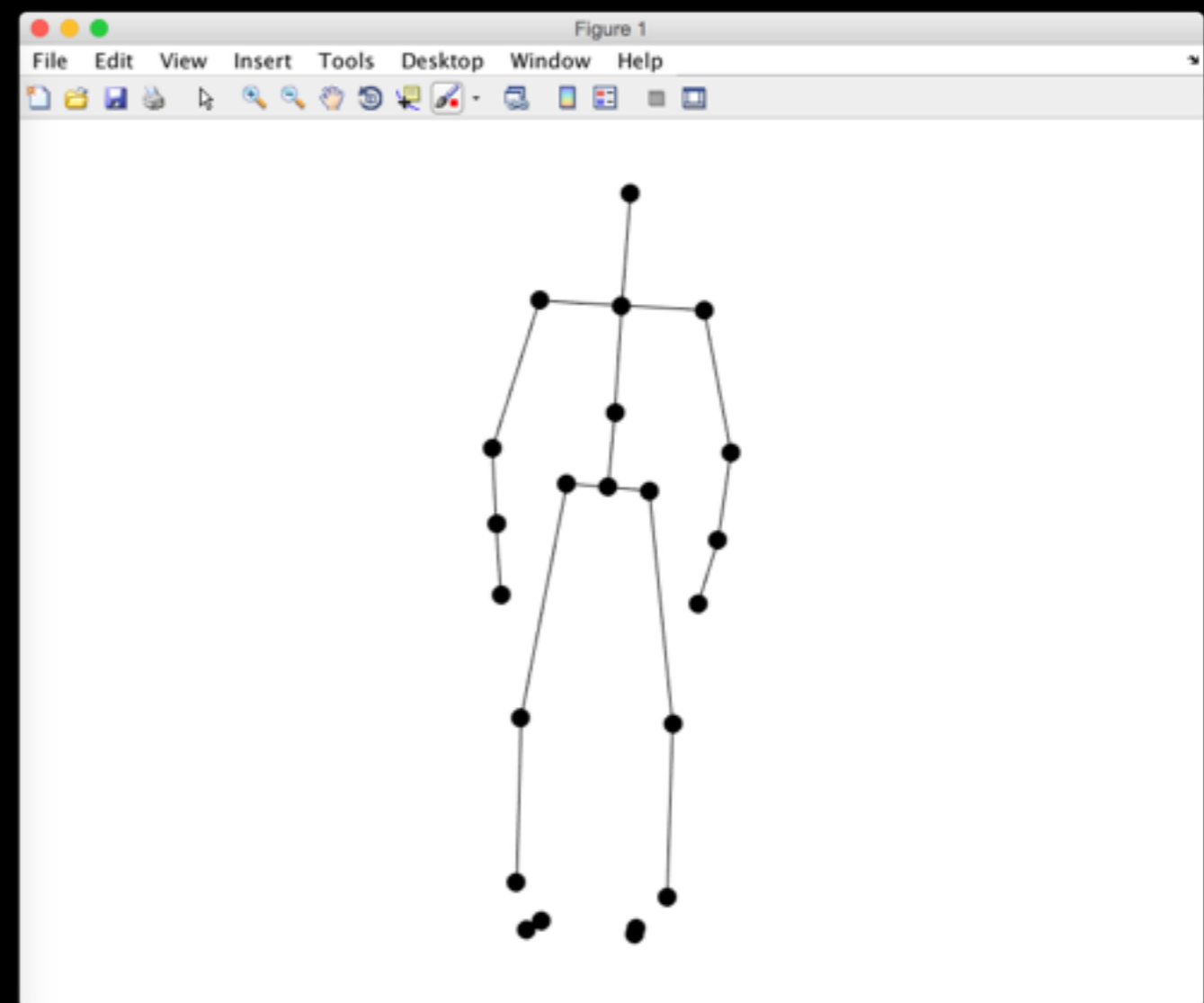
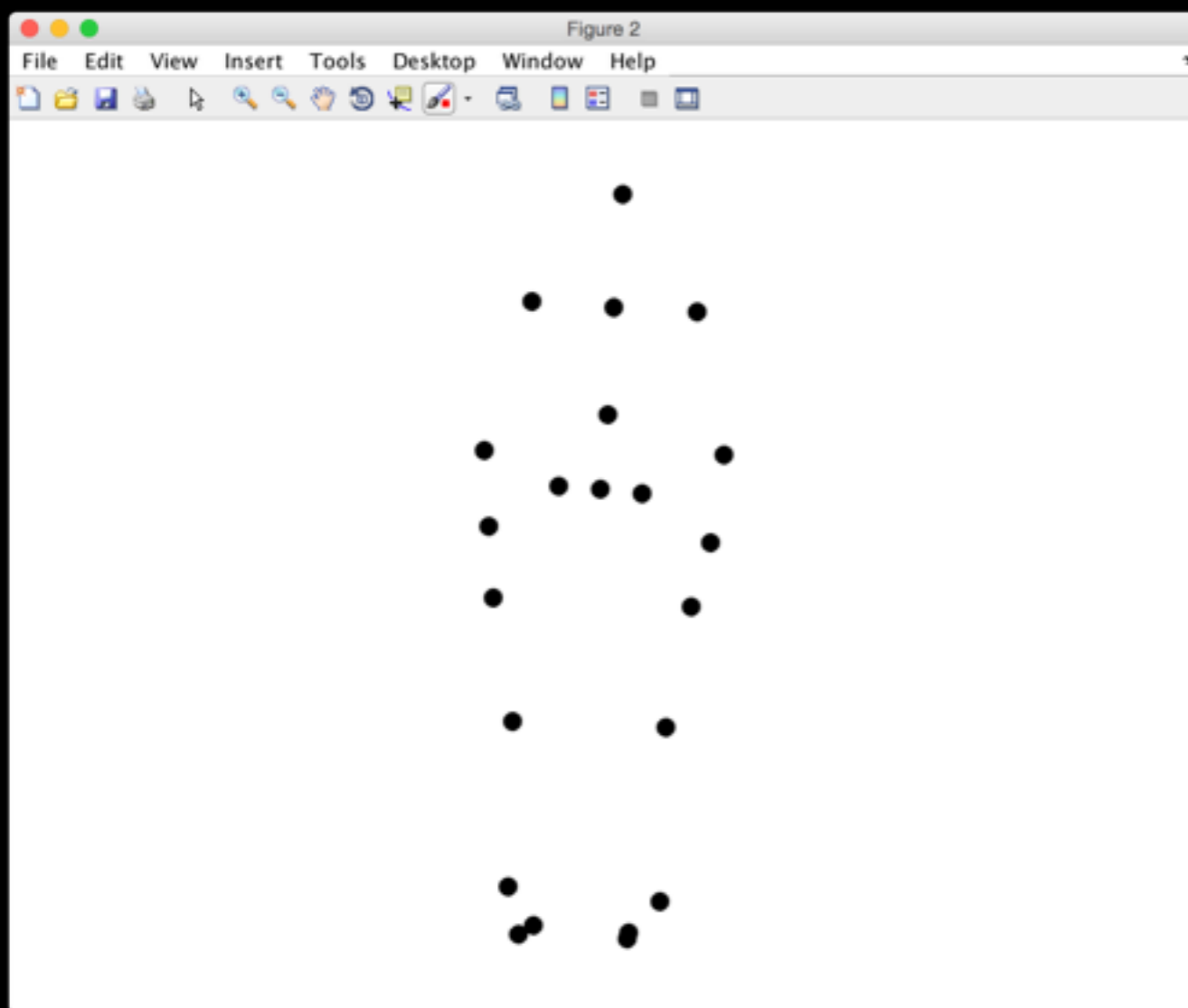
Forsøket til oppgave 3



26 markører



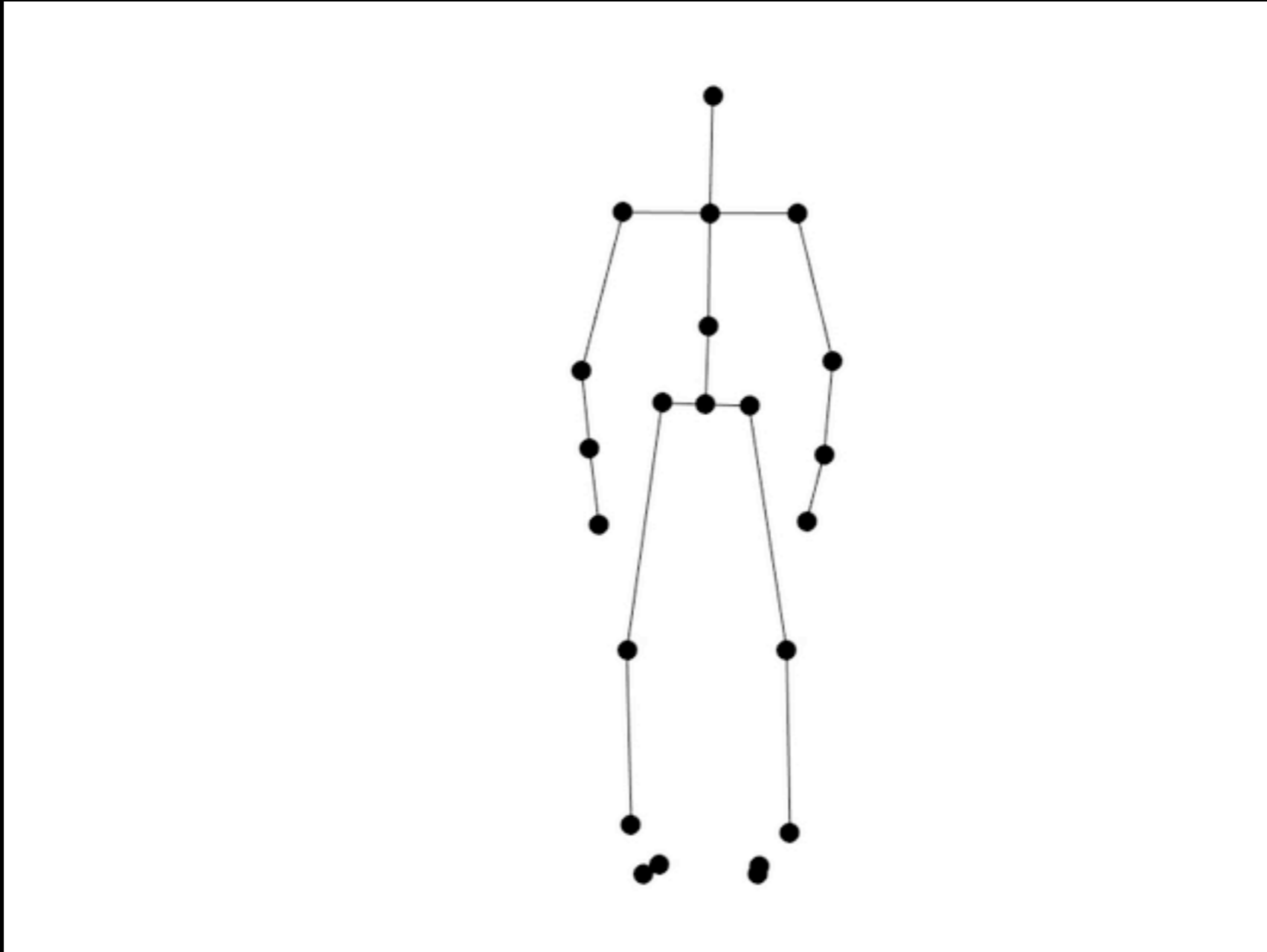
Redusert representasjon



Stillbilder



Animasjon



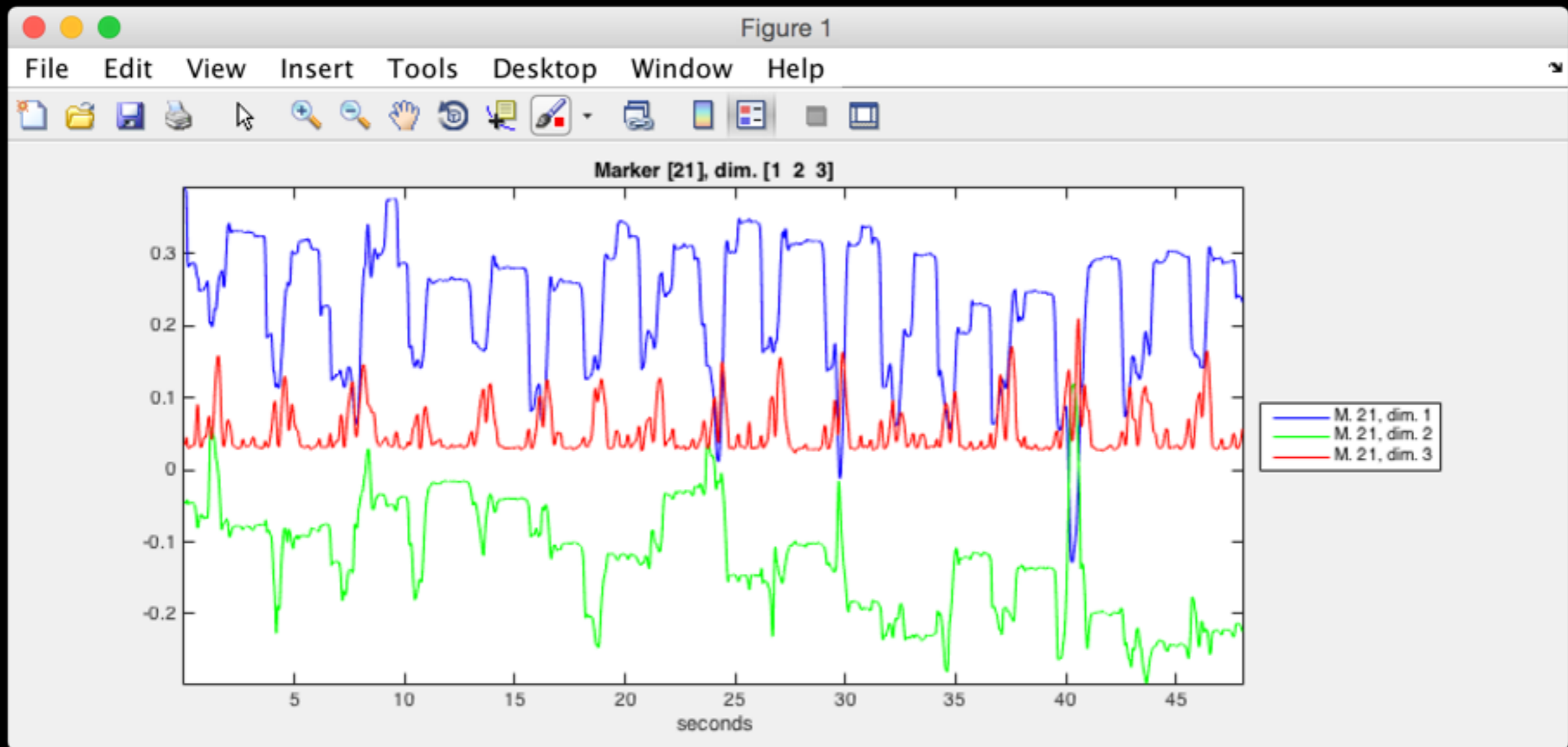
Tilnærminger

- Se på hele kroppen?
 - Vanskelig å gjøre en presis analyse
- Se på bare én markør?
 - Ser bort ifra hva resten av kroppen gjør
- En mellomting?

Enkeltmarkører

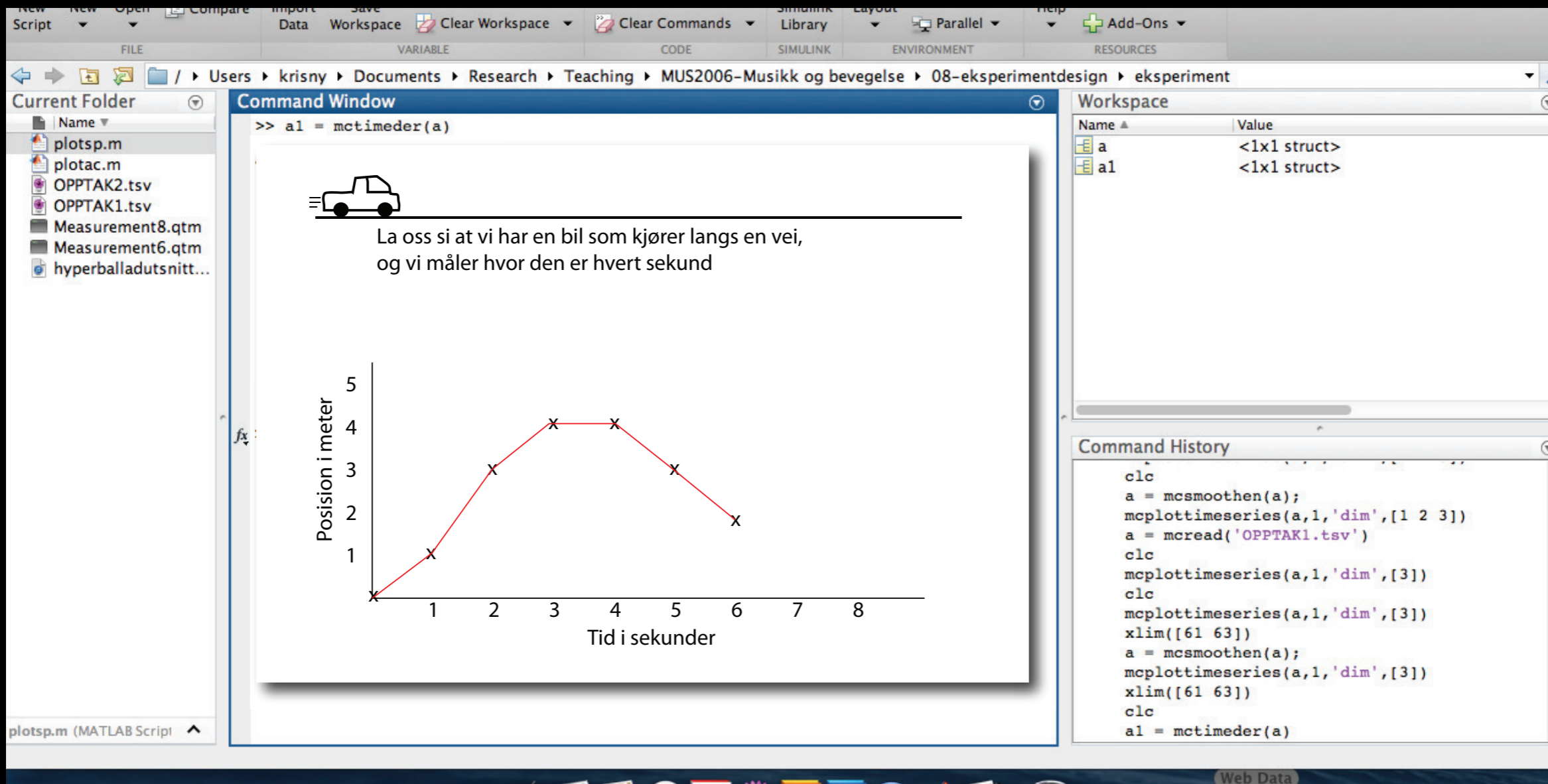
- Posisjon
- Hastighet
- Akselerasjon
- Periodisitet
- ...

Posisjon til venstre hæl:



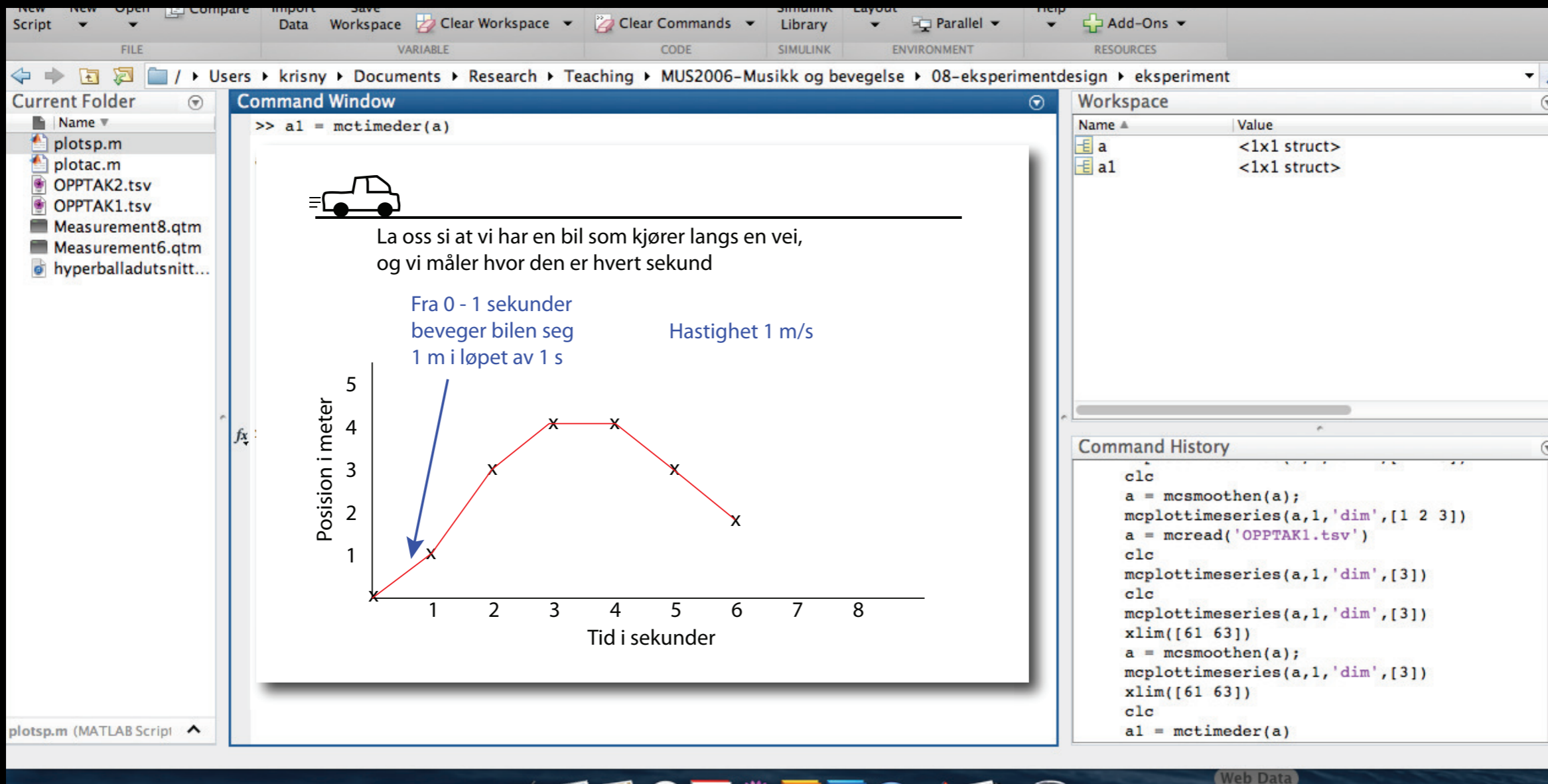
Hastighet

- Kan beregnes ved hjelp av derivasjon



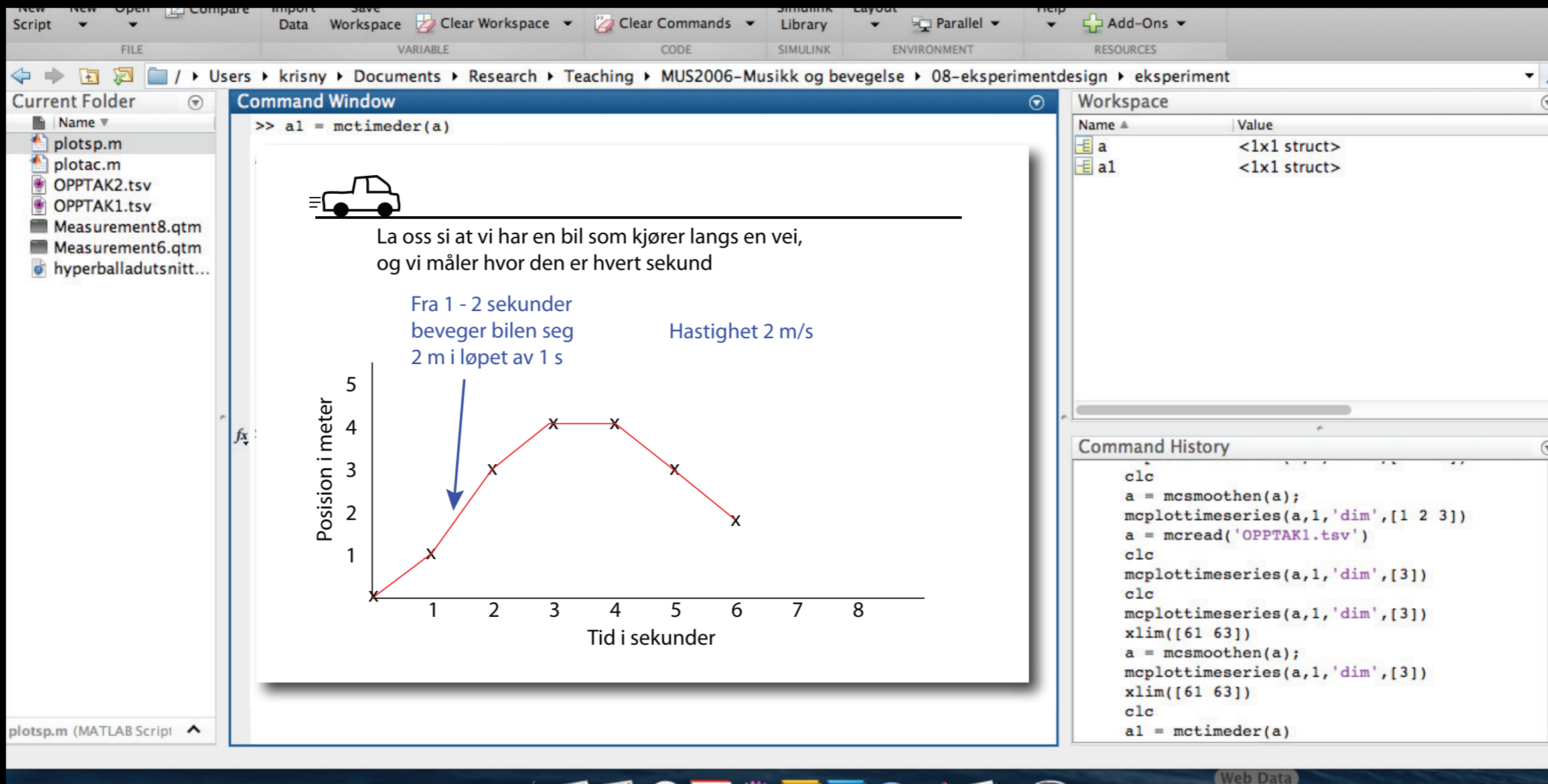
Hastighet

- Kan beregnes ved hjelp av derivasjon



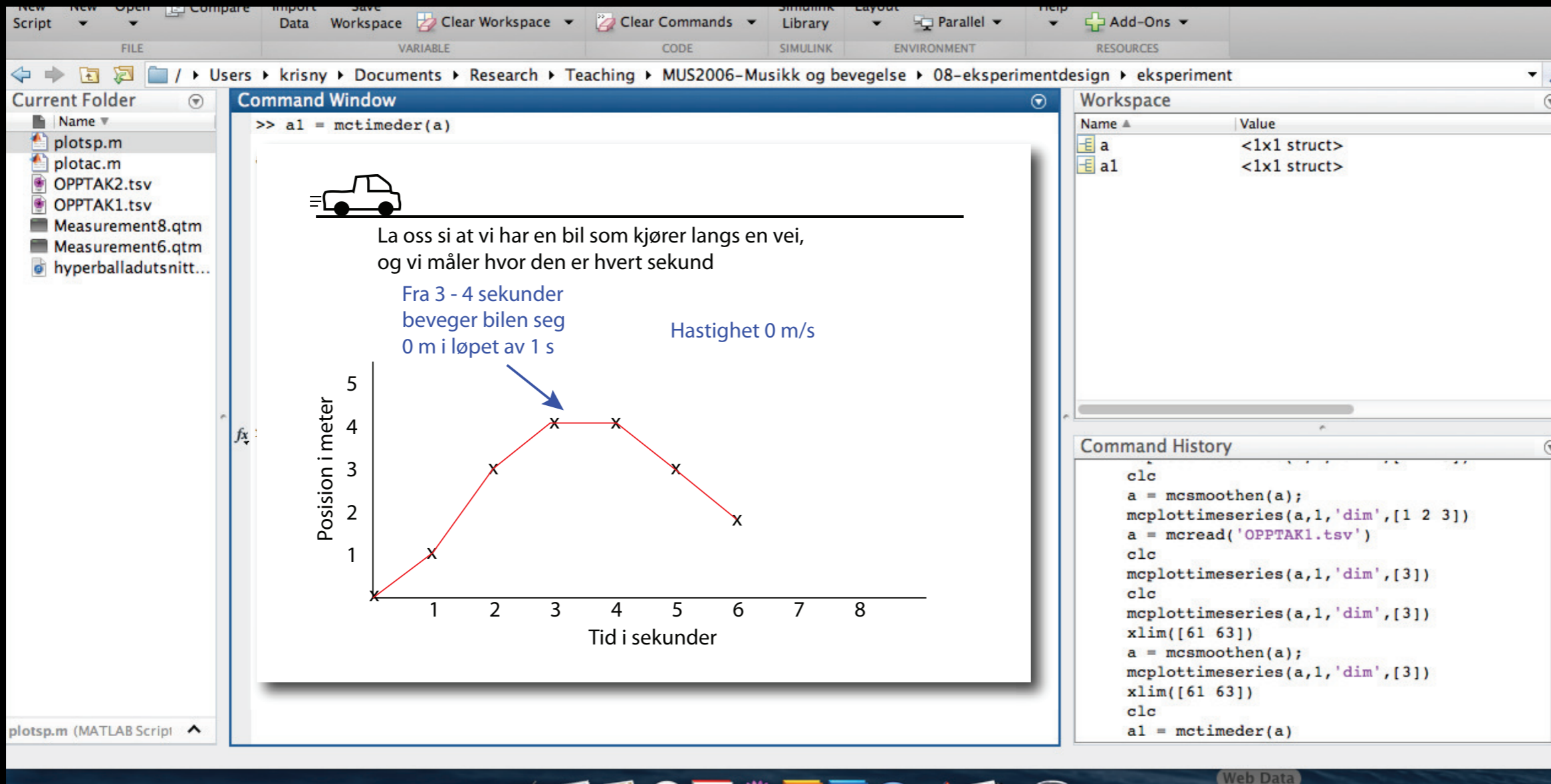
Hastighet

- Kan beregnes ved hjelp av derivasjon



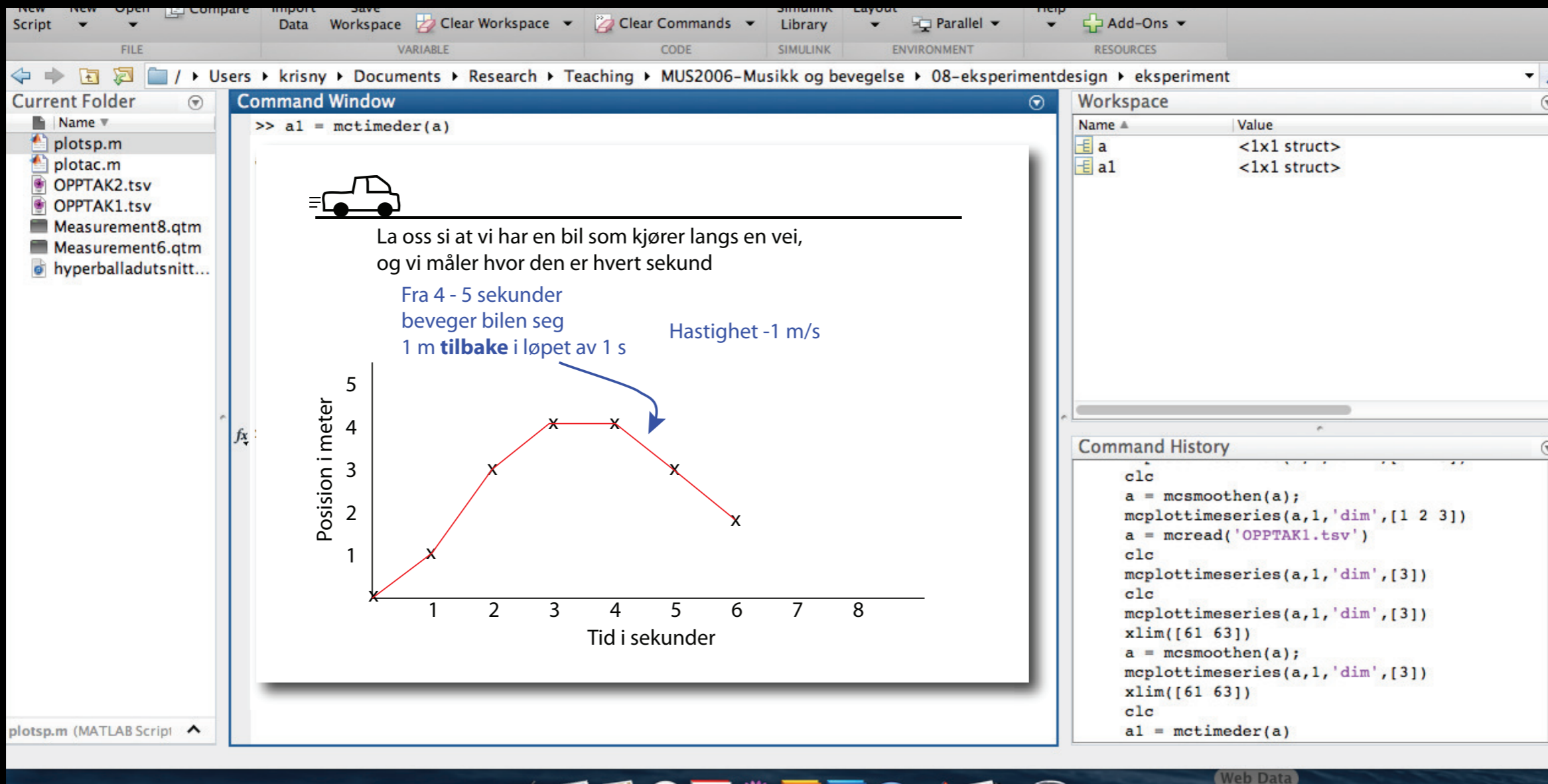
Hastighet

- Kan beregnes ved hjelp av derivasjon



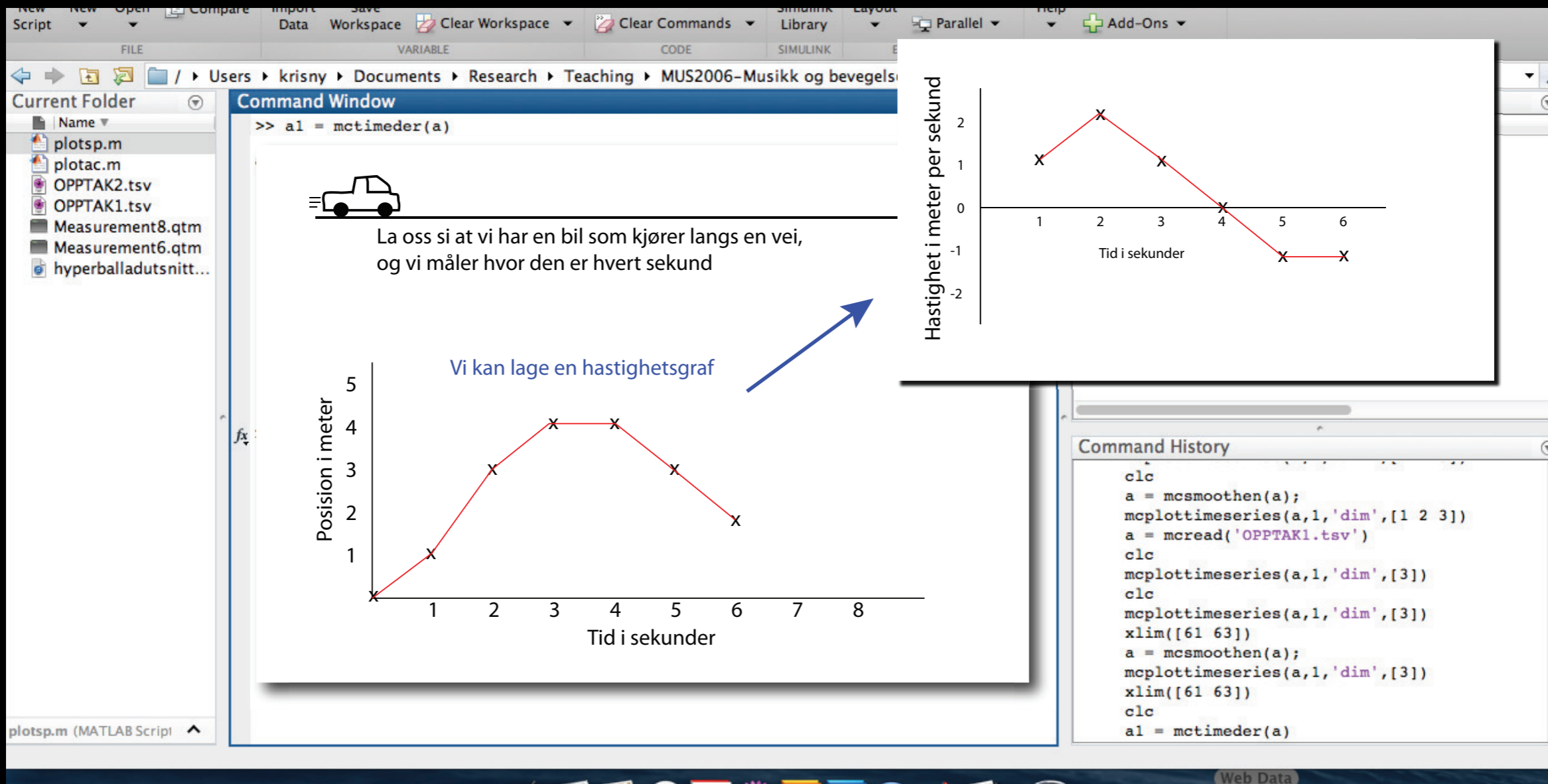
Hastighet

- Kan beregnes ved hjelp av derivasjon



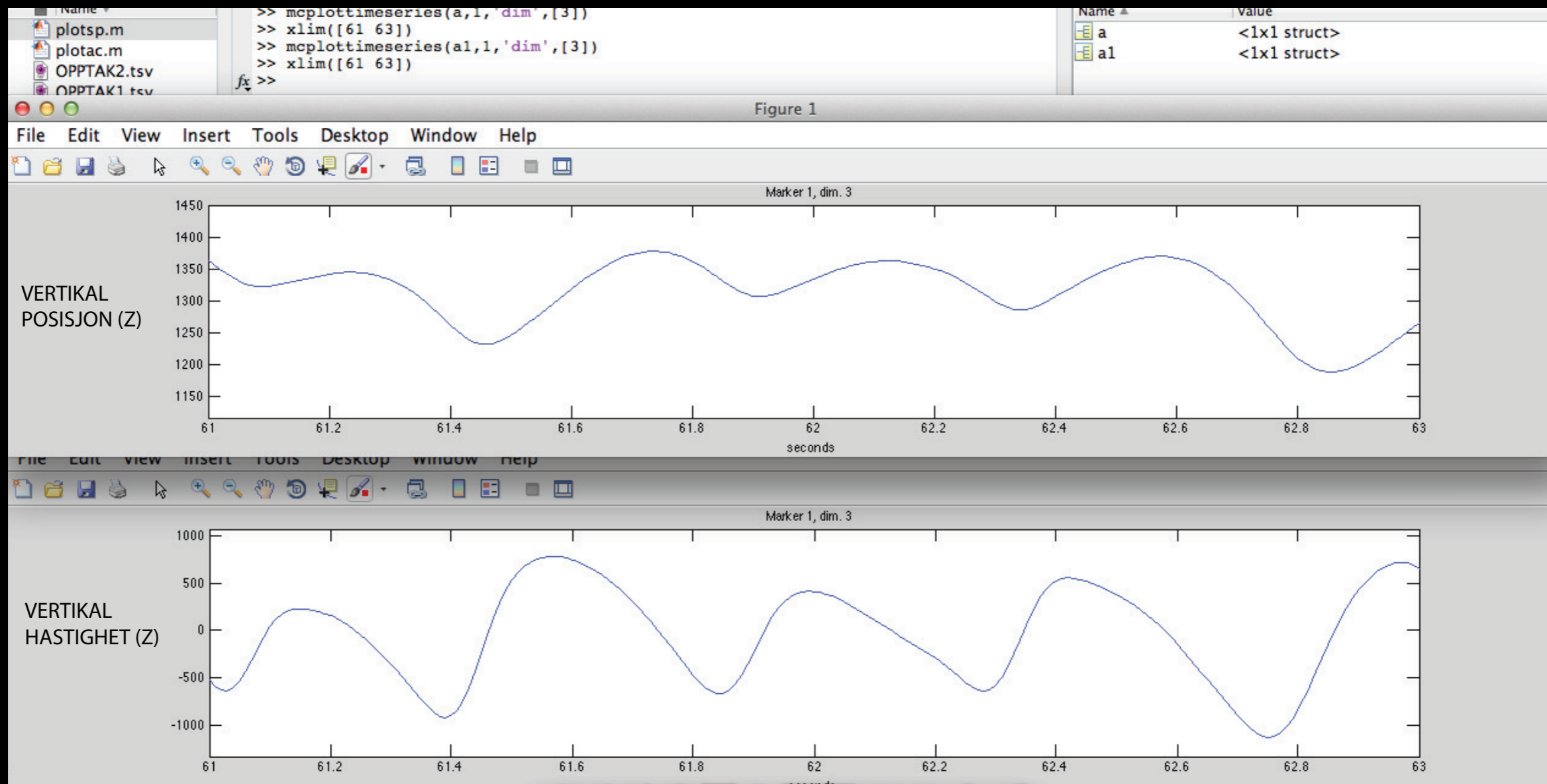
Hastighet

- Kan beregnes ved hjelp av derivasjon



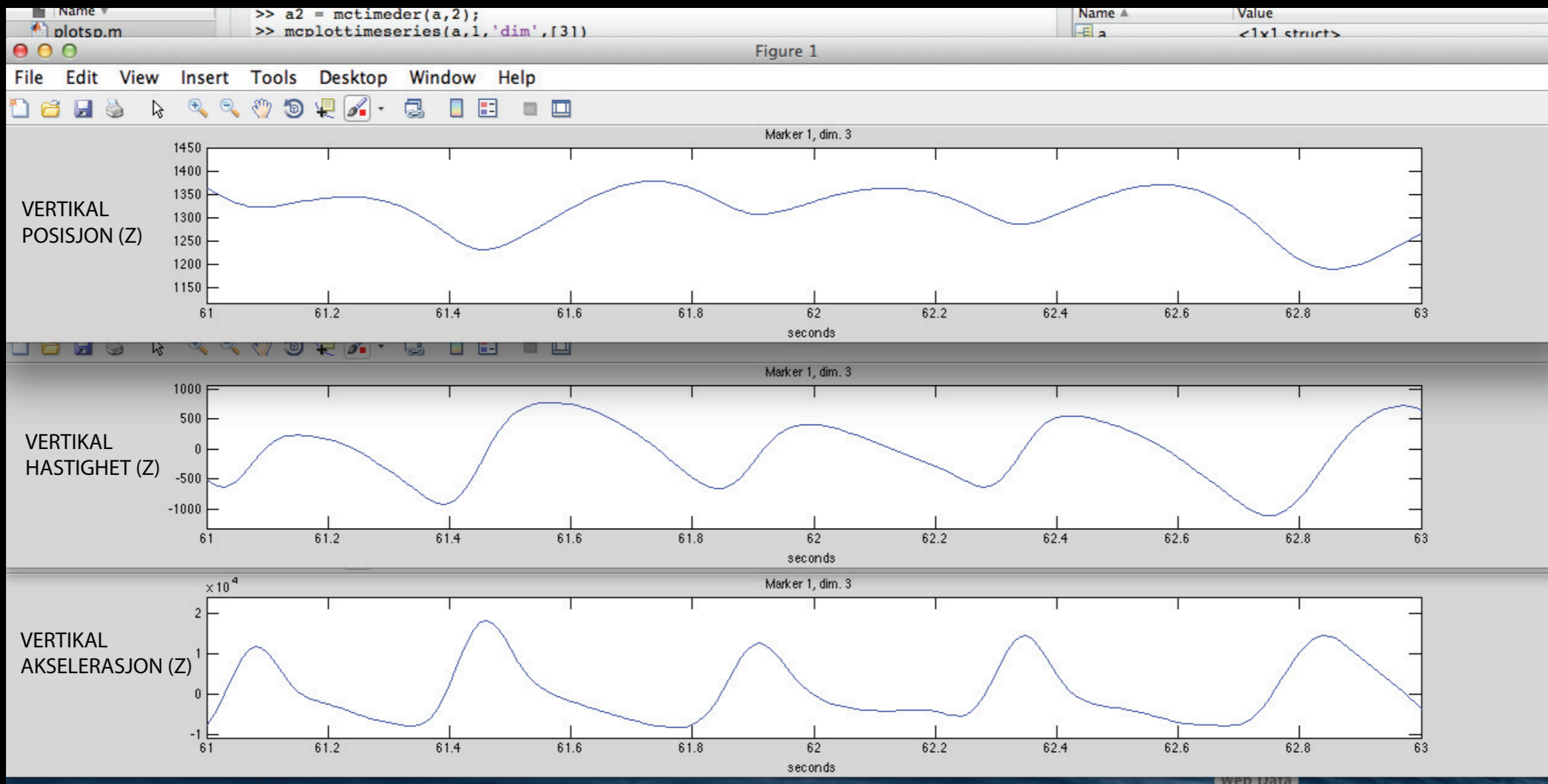
Hastighet

- Kan beregnes ved hjelp av derivasjon



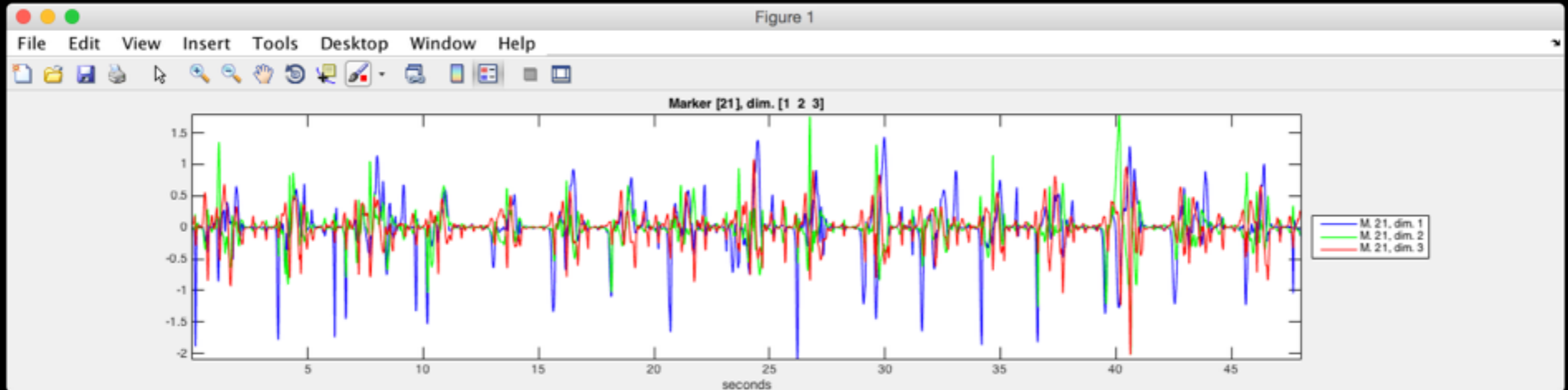
Akselerasjon

- Derivasjon av hastighet

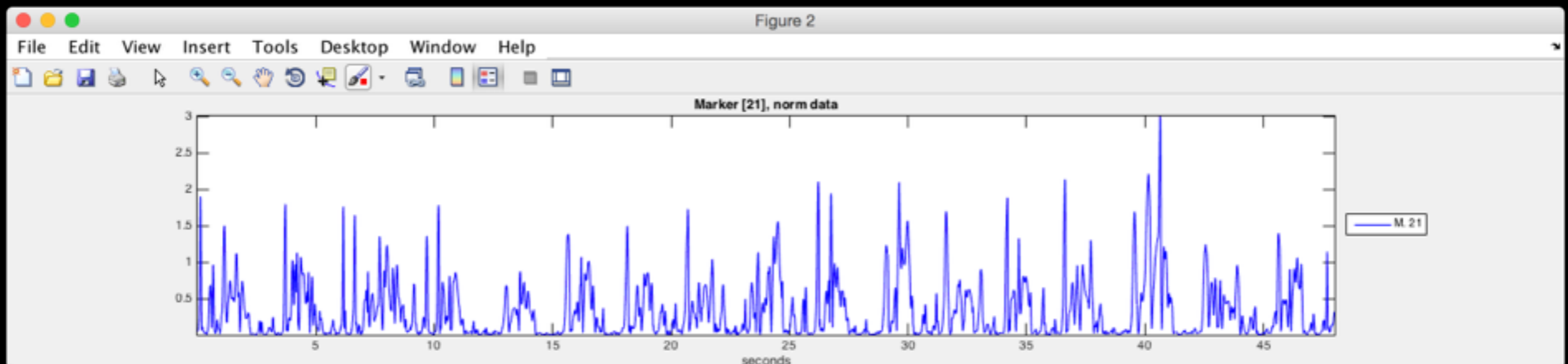


Tilbake til opptaket vårt (hastighet for venstre hæl)

X-hastighet, Y-hastighet og Z-hastighet:

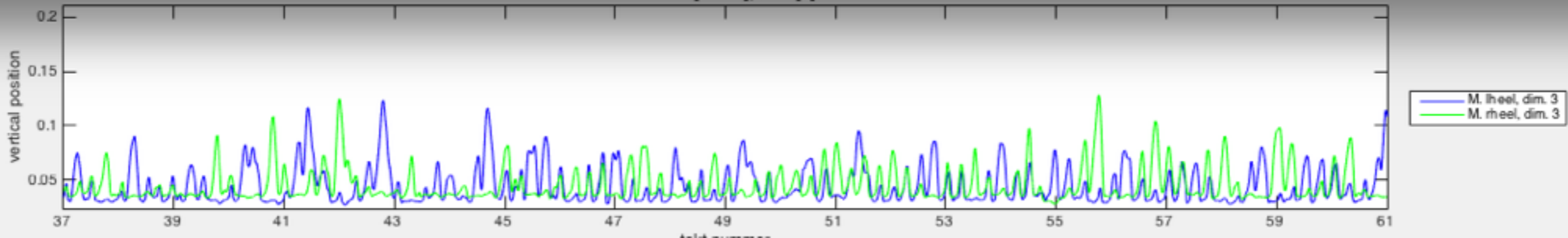
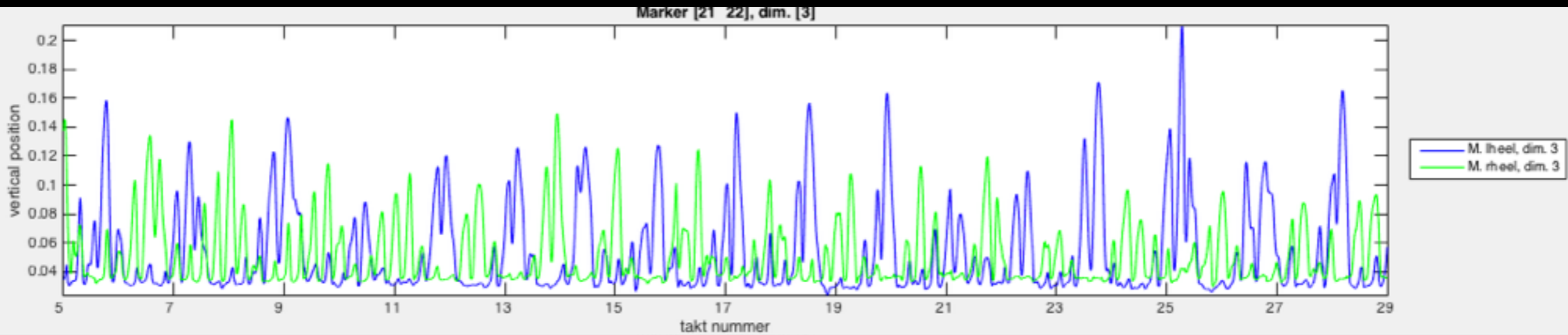


Hastighet uten retningsinformasjon (absolutt hastighet):



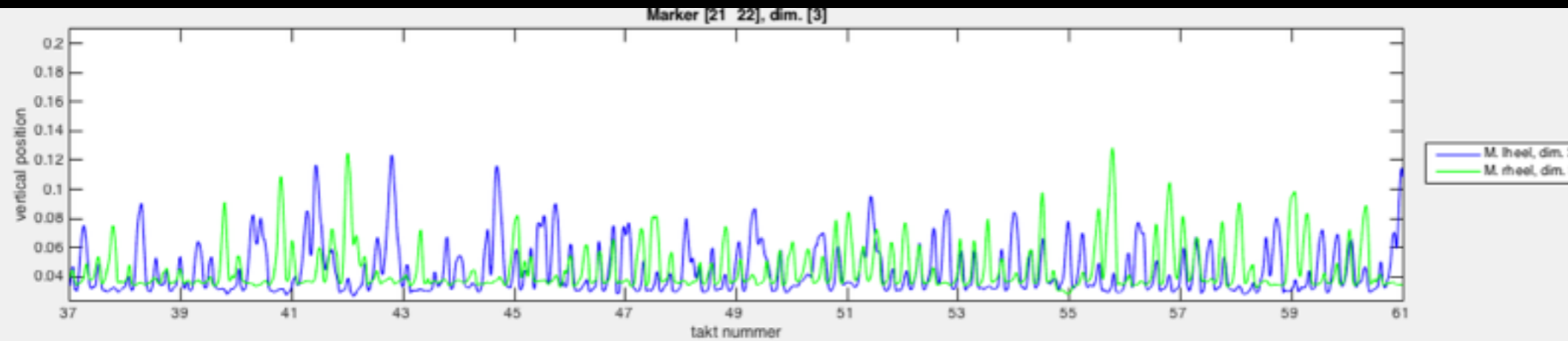
Vertikal posisjon for venstre og høyre hæl

Elektronisk dansemusikk (EDM)

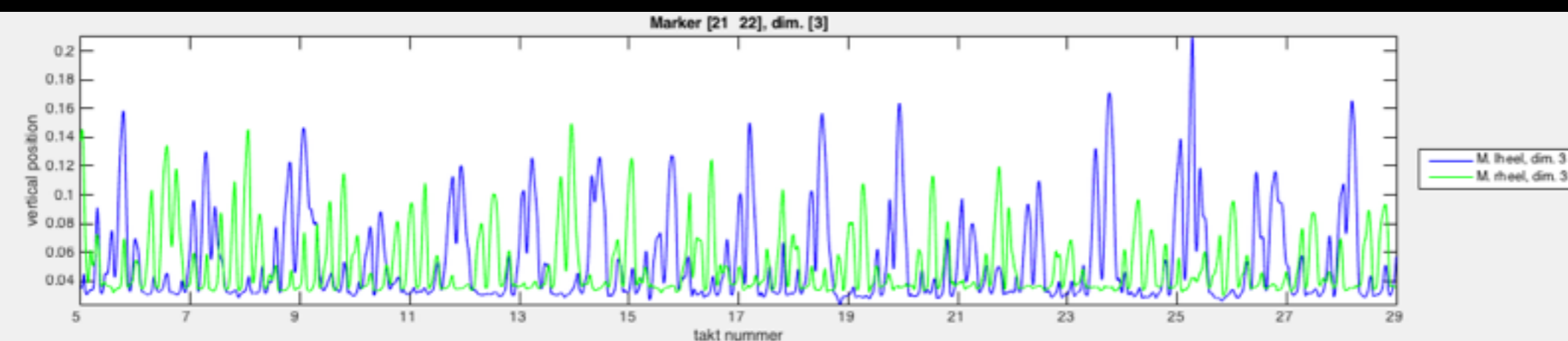
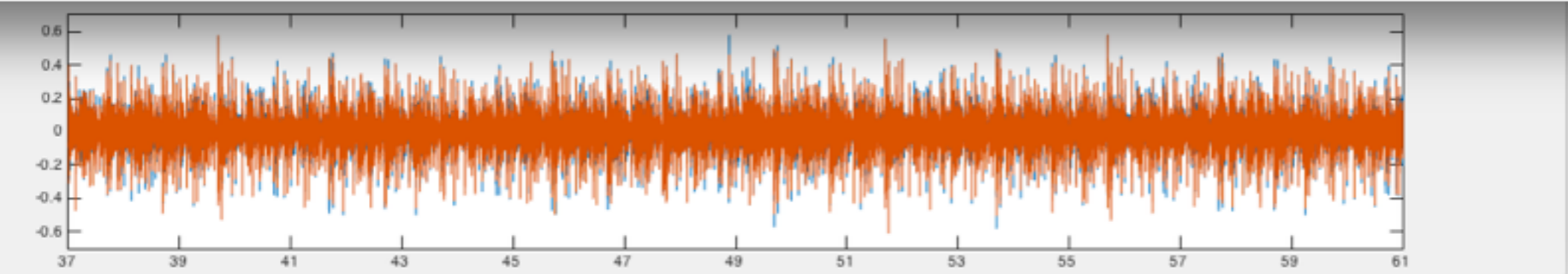


Salsa

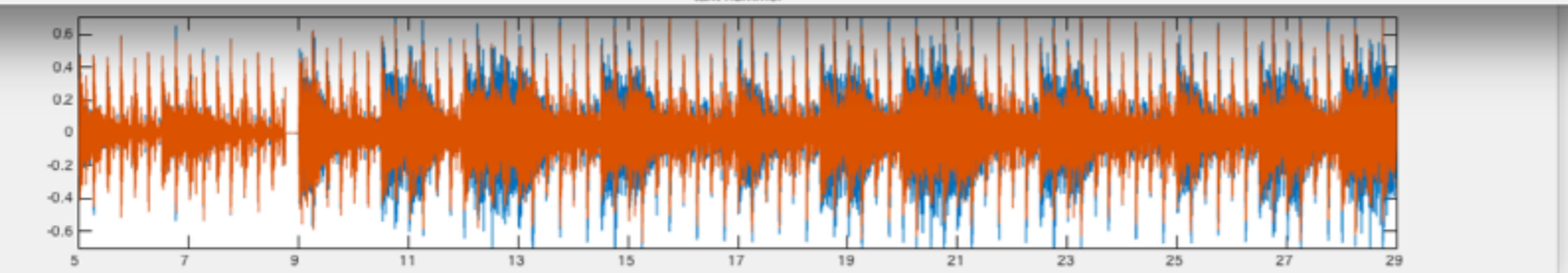
Vertikal posisjon for venstre og høyre hæl



Salsa



Elektronisk
dansemusikk
(EDM)

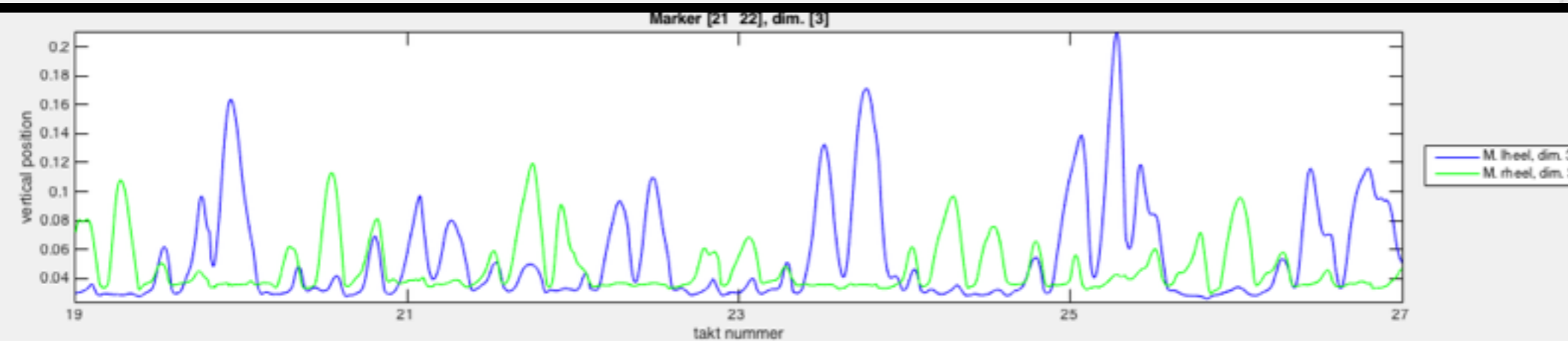
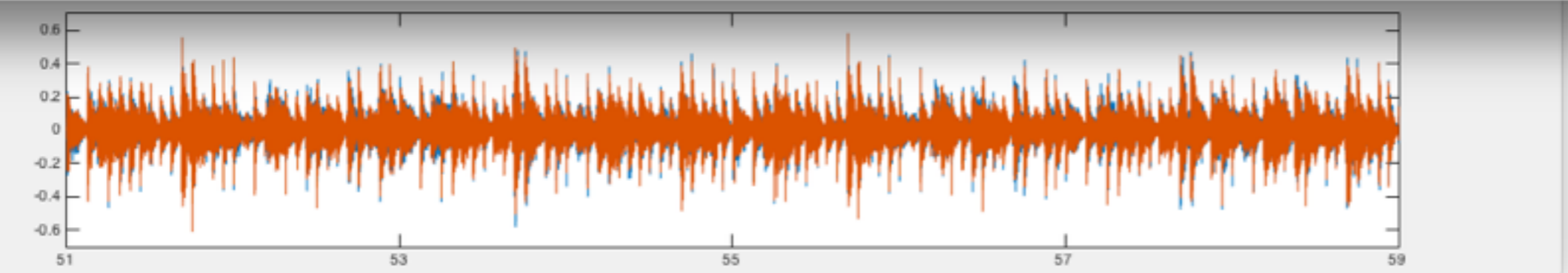


Vertikal posisjon for venstre og høyre hæl

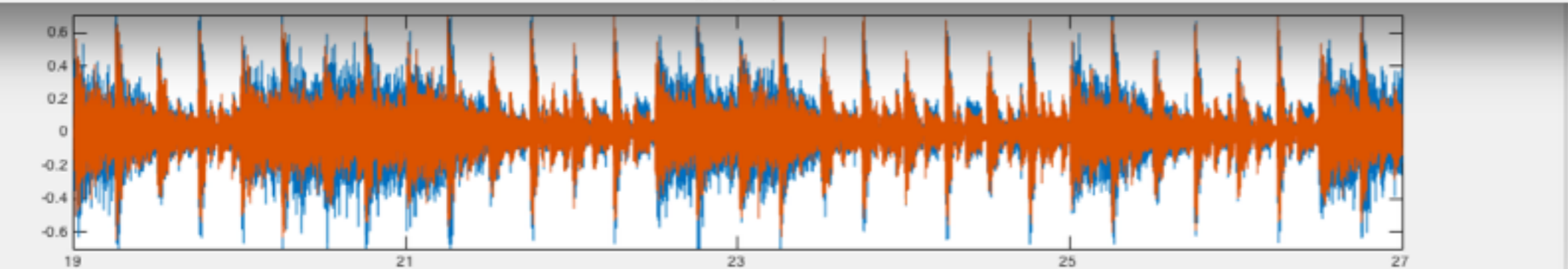
Zoomet inn på 3 takter



Salsa



Elektronisk
dansemusikk
(EDM)



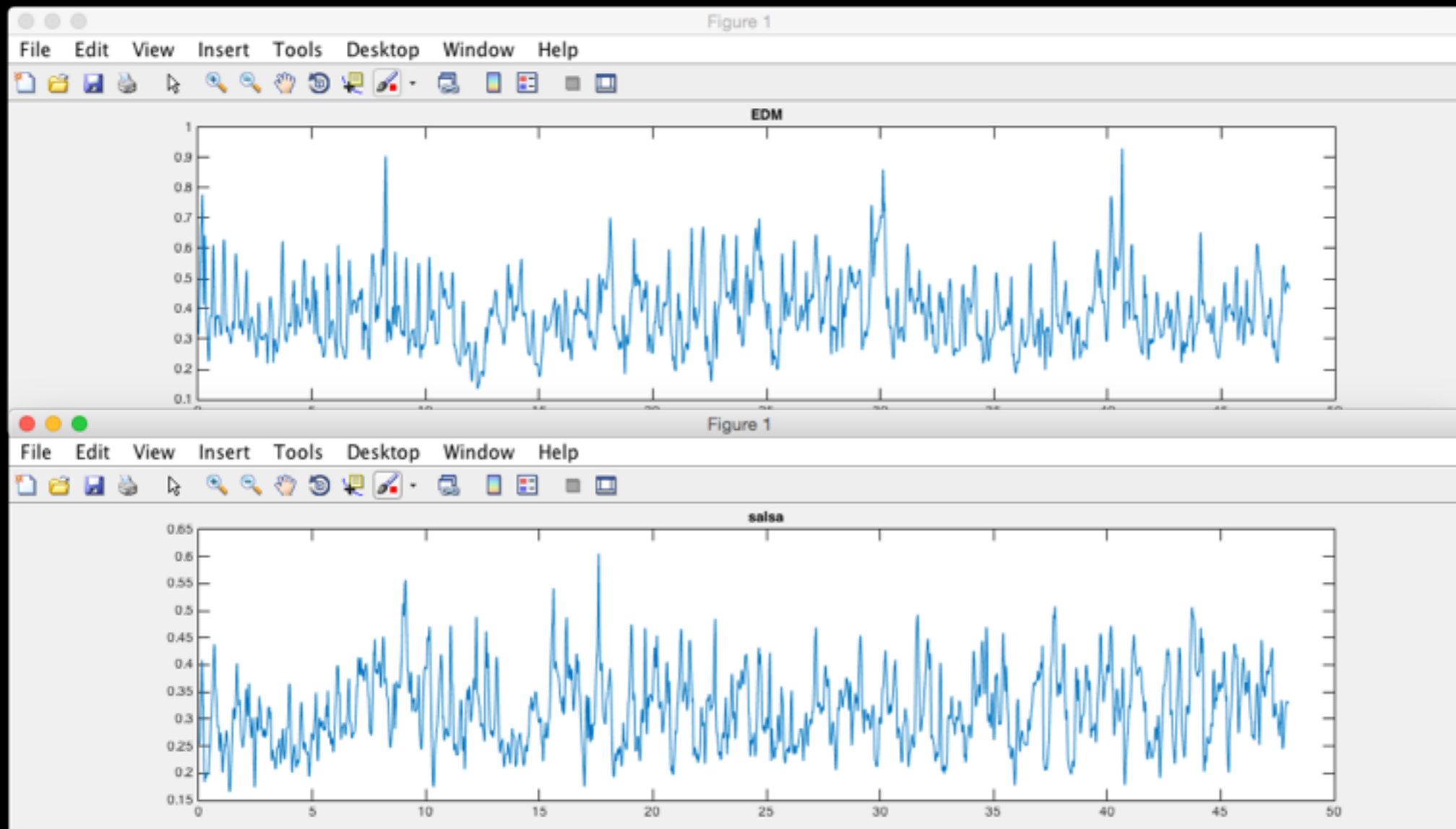
Hele kroppen

- Bevegelsesmengde (Quantity of motion)
- Centroide
- Bounding box

Bevegelsesmengde

Total bevegelse i alle markører

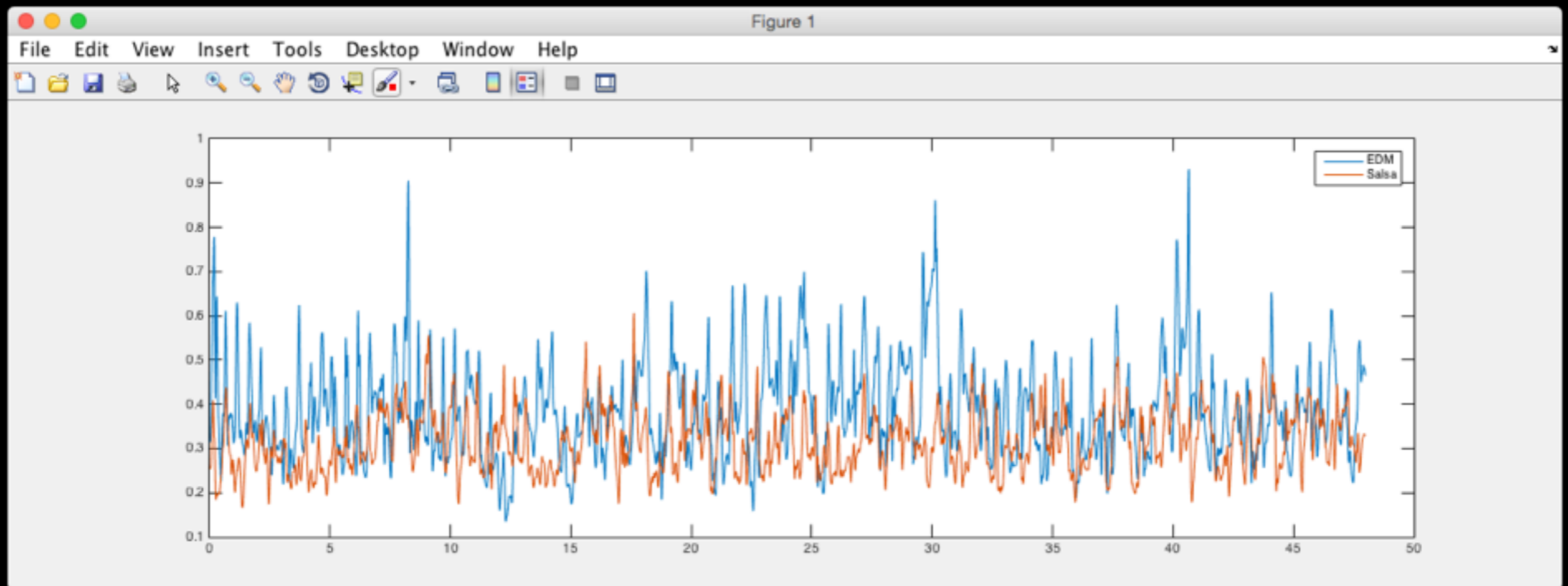
- Upresist mål, men godt utgangspunkt for kvalitativ analyse
- Ingen klar definisjon (må alltid presisere hvordan beregnet)



Elektronisk
dansemusikk

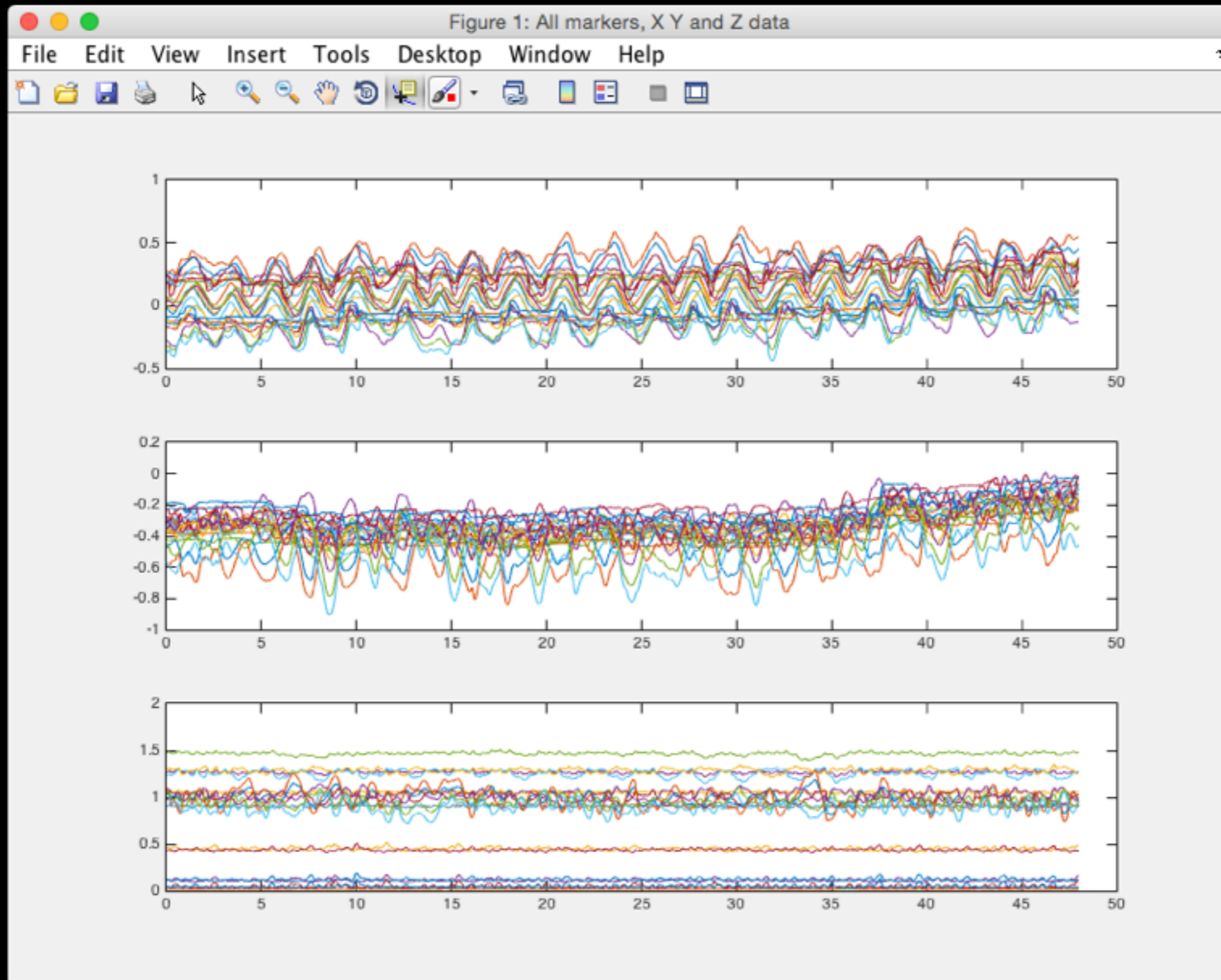
Salsa

Bevegelsesmengde

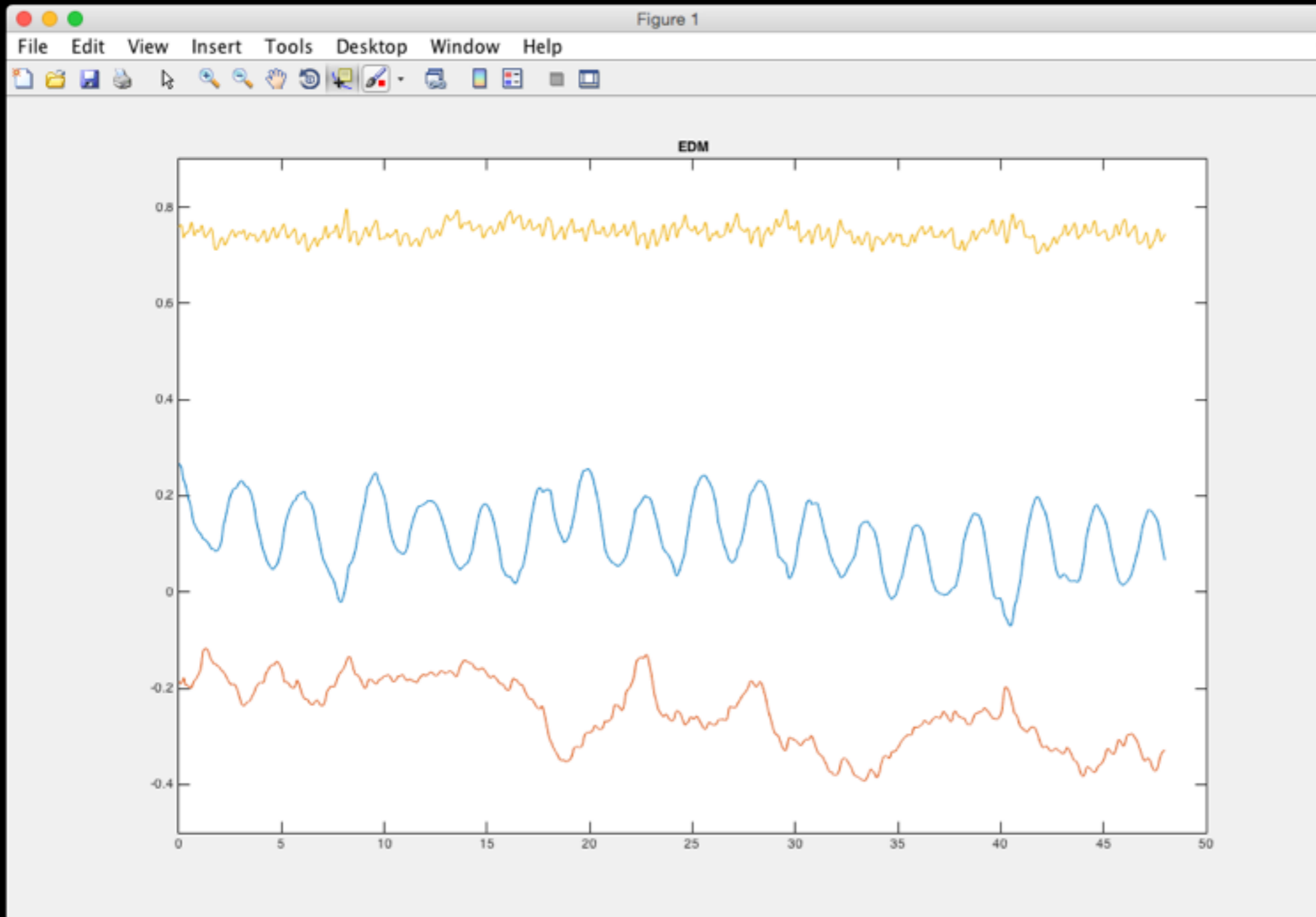


- I dette eksempelet er bevegelsesmengden større for EDM enn salsa
- Det er også jevnere topper i EDM-kurven

Alle markører, XYZ



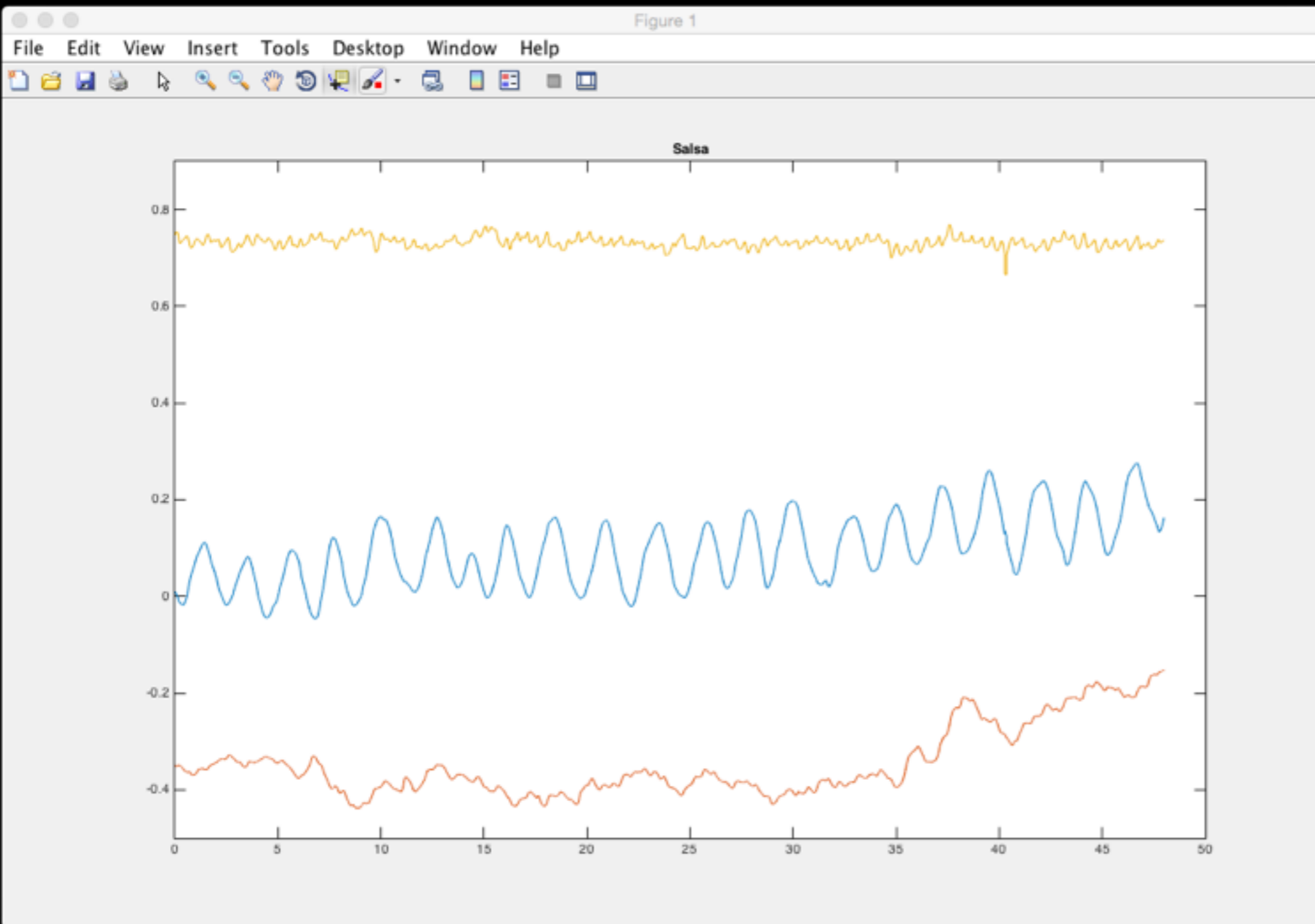
Centroide: midtpunktet i kroppen



blå X
rød Y
gul Z

Elektronisk
dansemusikk

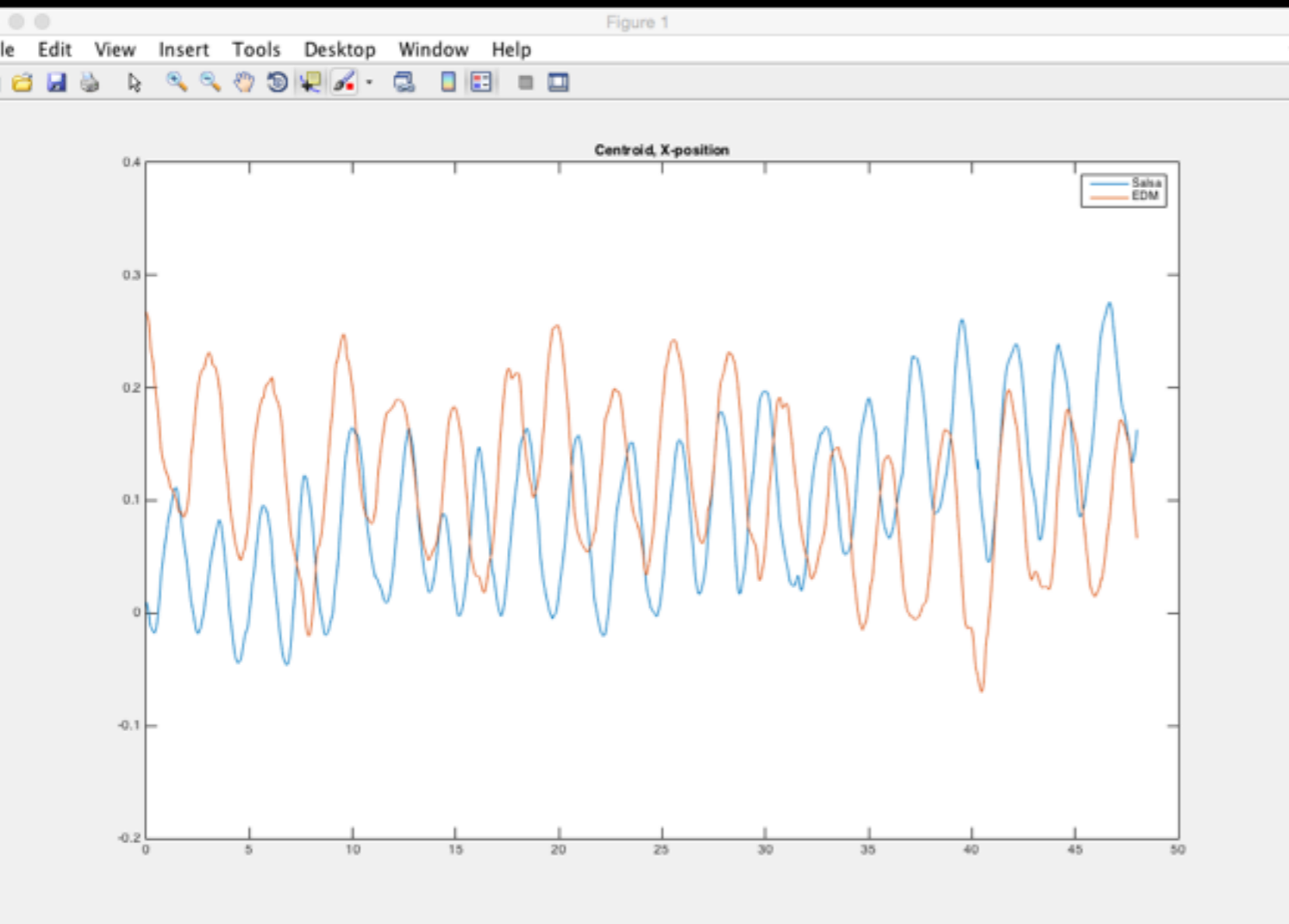
Centroide: midtpunktet i kroppen



blå X
rød Y
gul Z

salsa

Centroide: midtpunktet i kroppen



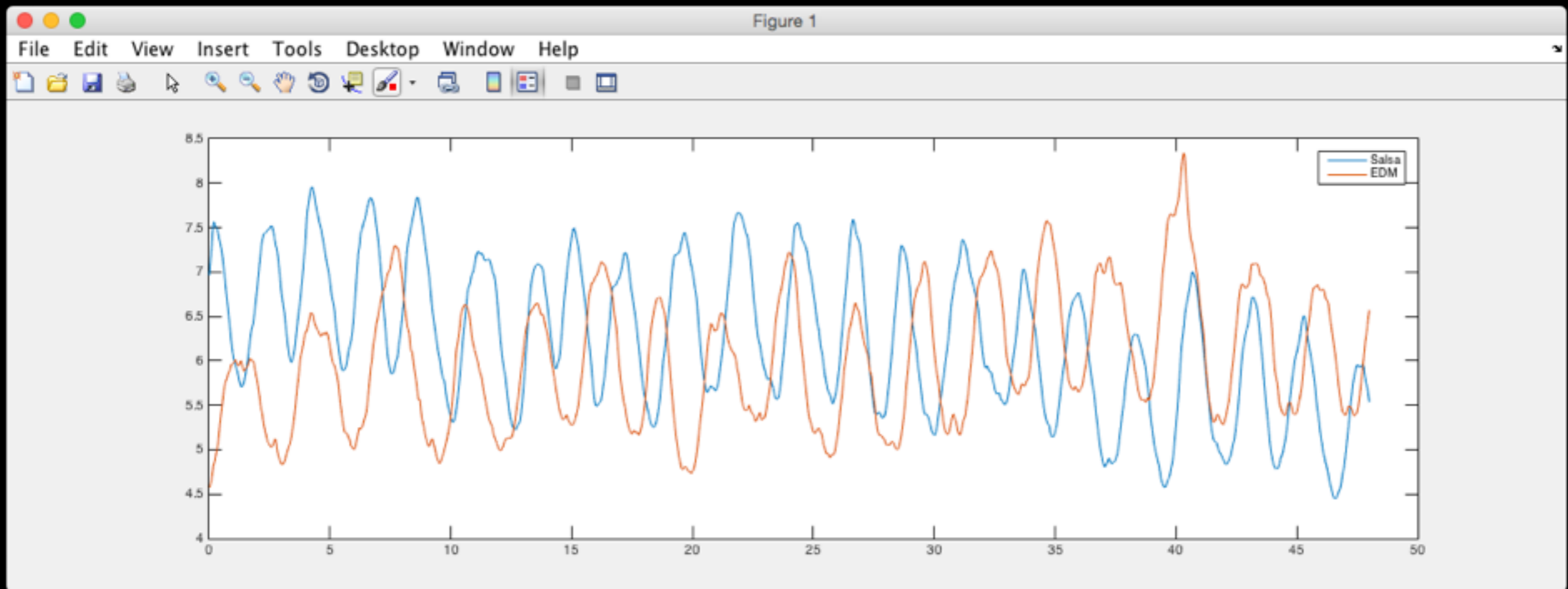
blå salsa
rød EDM

Sammenlikning av
sidelengs bevegelse
i personens dans til
de ulike sjangerene

Salsa: periode 2.2 sek
EDM: periode 2.75 sek

Bounding box / bevegelsesområde

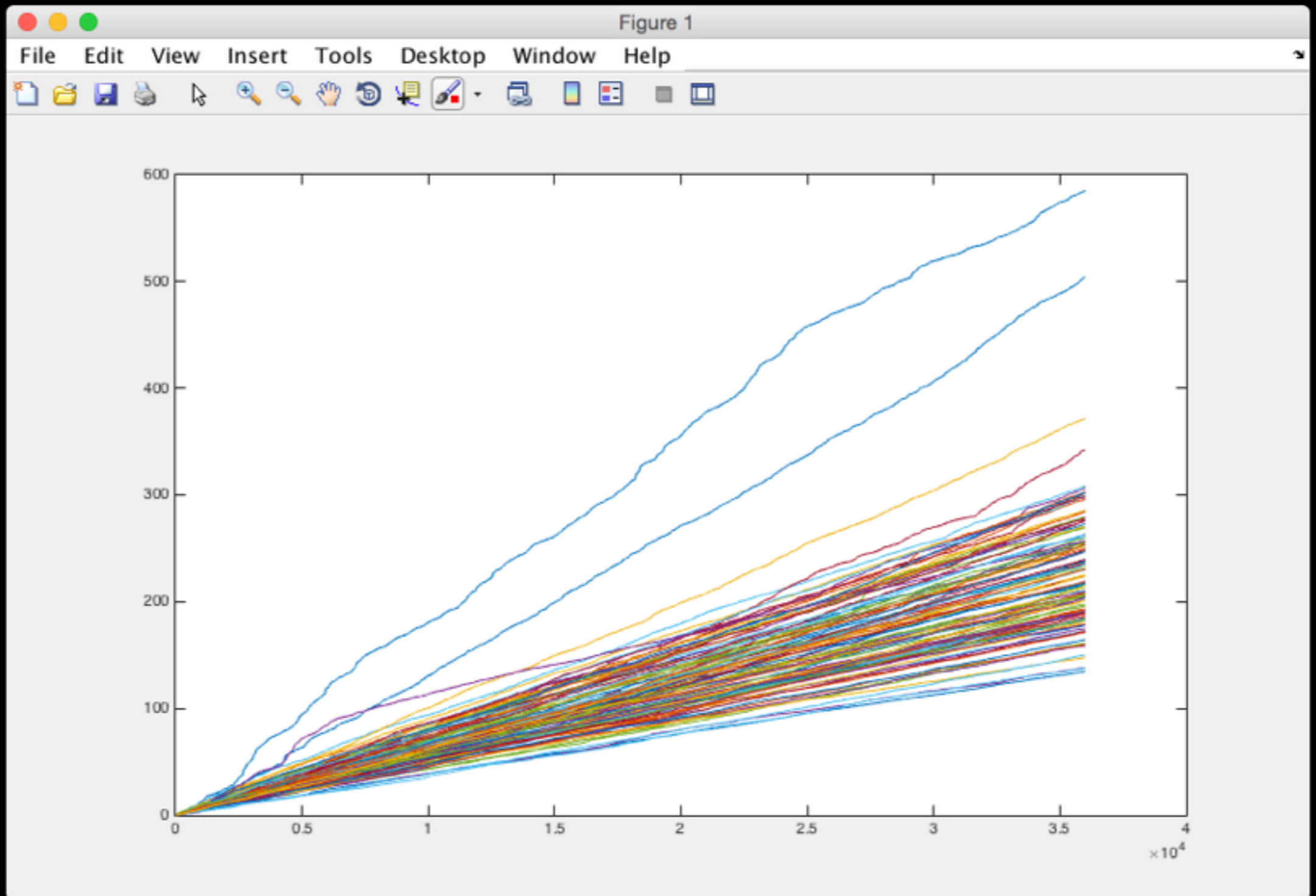
blå salsa
rød EDM



NM i stillstand

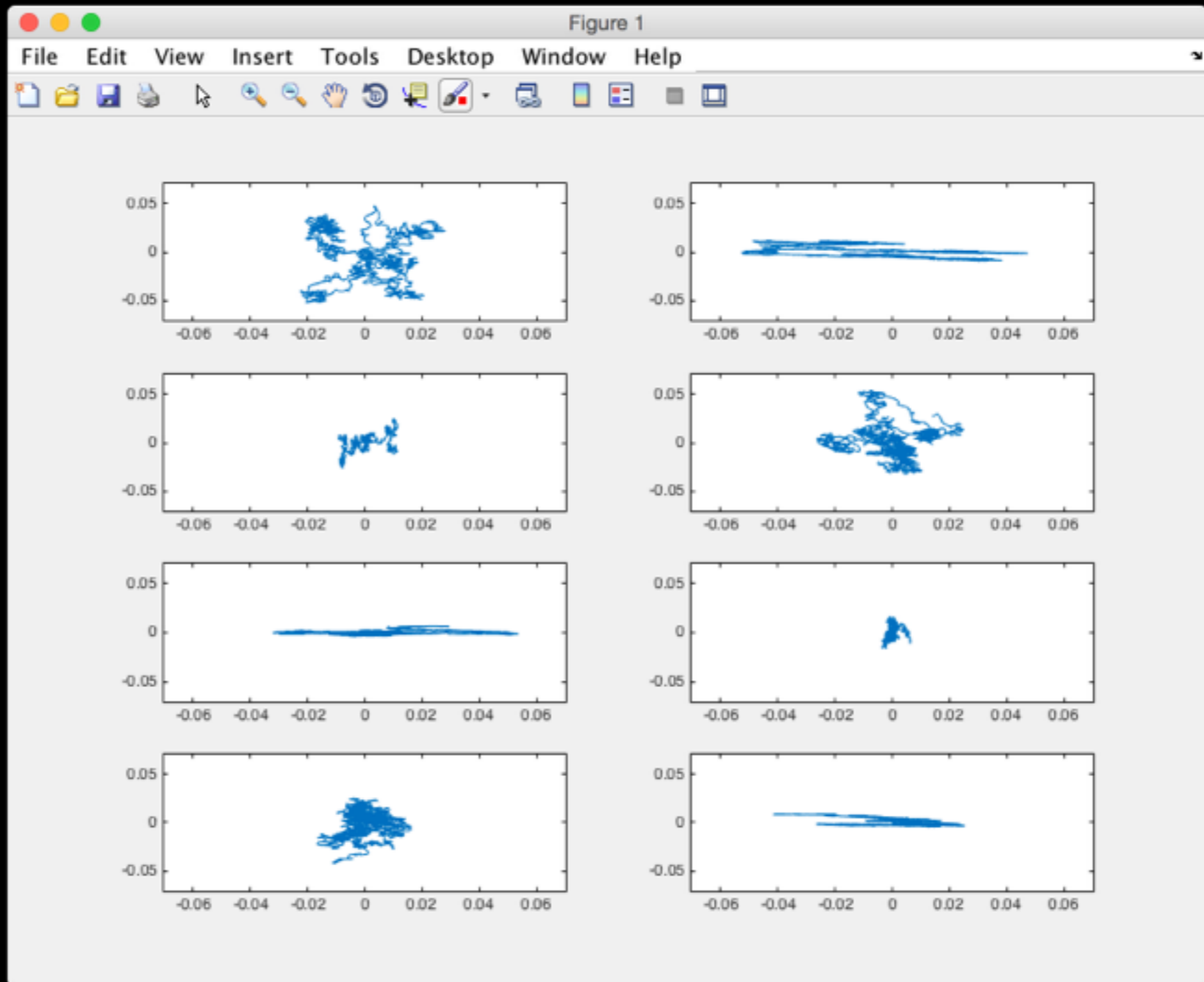
NM i stillstand

- Cumulative distance traveled



NM i stillstand

- XY-plots

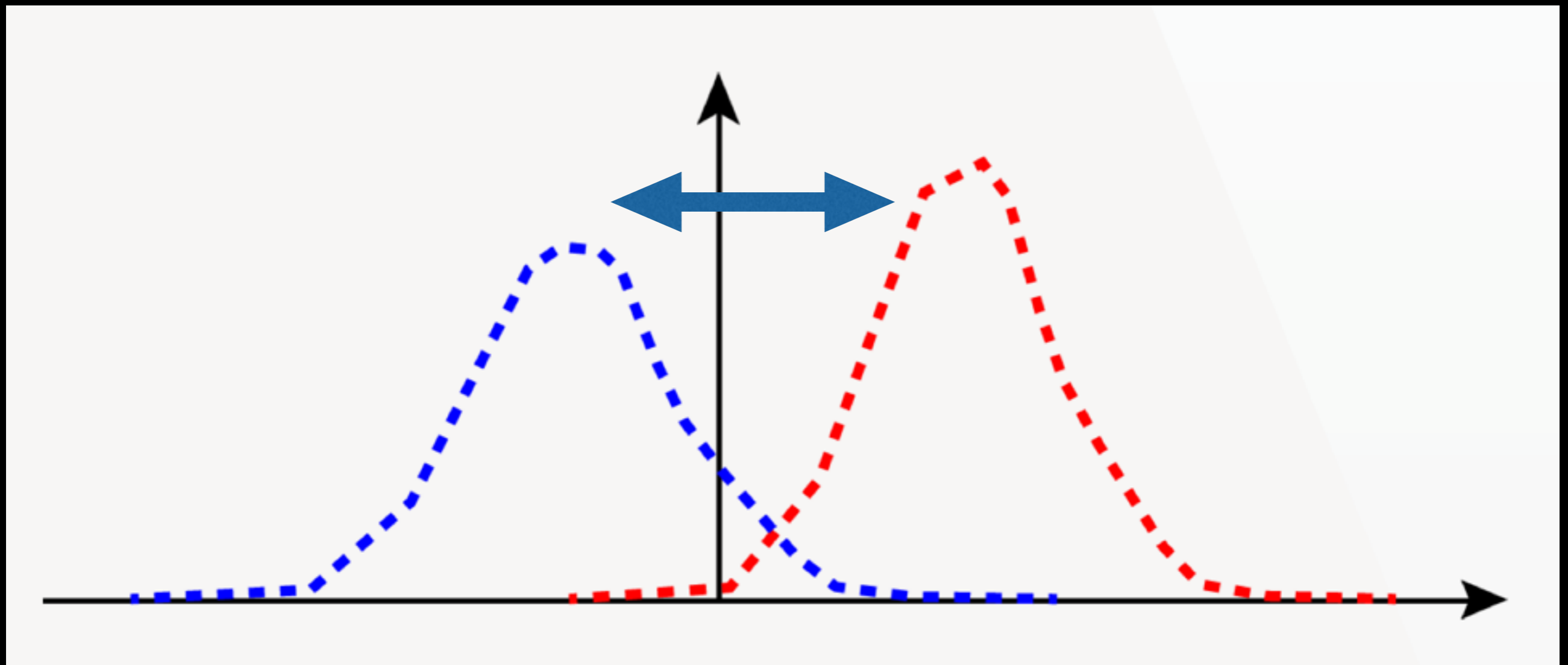


NM i stillstand

- Godt egnet forsøk for kvantitativ analyse.
 - mange deltakere
 - klart definert problemstilling
 - "Er det vanskeligere å stå stille når man hører dansemusikk?"
 - klart definerte mål som skal sammenliknes:
 - Gjennomsnittshastighet i stille perioder
 - Gjennomsnittshastighet i perioder med musikk

NM i stillstand

(illustrasjon, ikke faktiske data)



uten musikk

med musikk

Enkel plotting i LibreOffice/OpenOffice og Excel

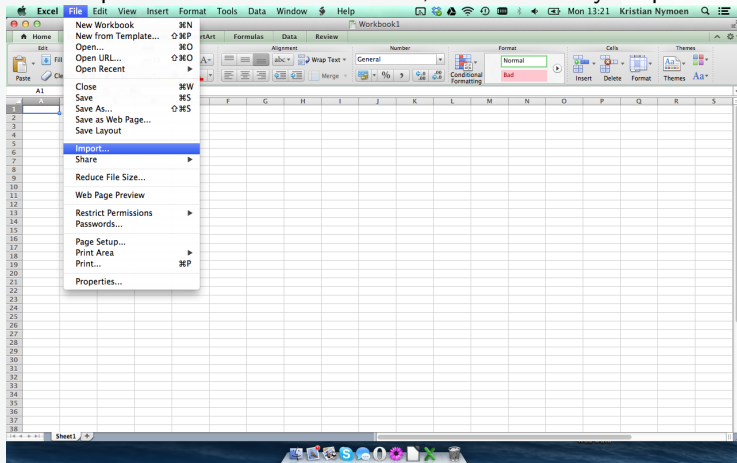
Innhold

- ▶ Nedenfor vises skjermbilder av steg-for-steg plotting i LibreOffice og Excel på Mac, og Excel på Windows.
- ▶ Utgangspunktet er en tekstfil med 1 kolonne med tid og 8 kolonner med data.
- ▶ Her vises det hvordan du kan plote alle kolonner i samme figur. For å få god oversikt kan det ofte være lurt å plote færre om gangen. Se et eksempel i Windows-gjennomgangen nedenfor.

Excel (Mac)

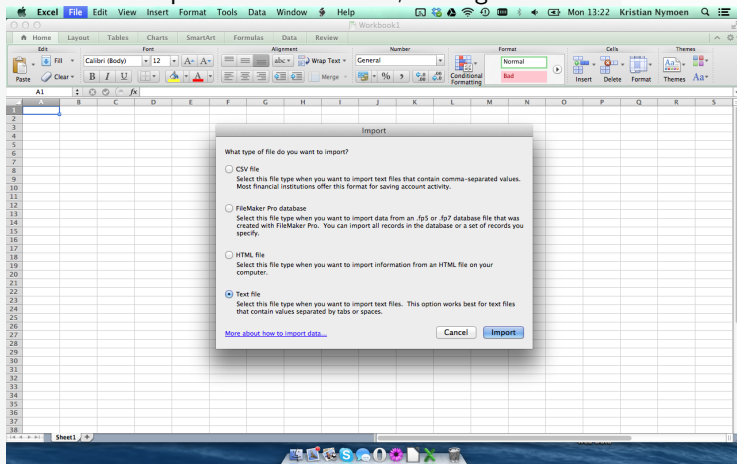
Excel (Mac)

For å importere dataene fra tekstfilen, start med å trykke på file→import



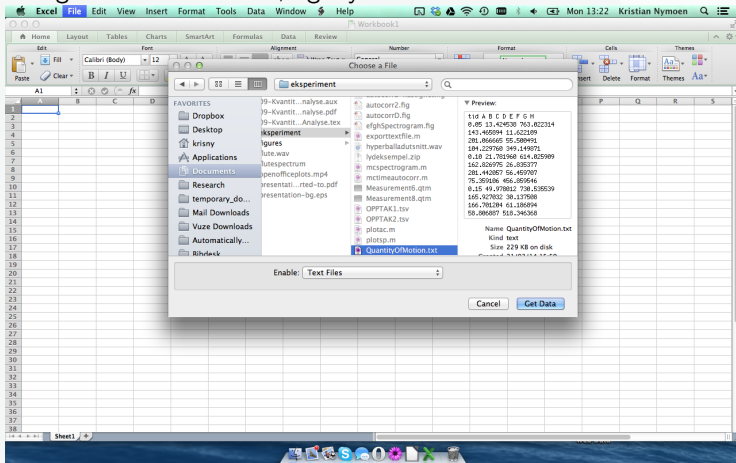
Excel (Mac)

Det du skal importere er en tekstfil, så velg "Text file"



Excel (Mac)

Naviger frem til filen din, og trykk "Get data"



Excel (Mac)

I denne tekstfilen er kolonnene skilt med et bestemt tegn (space), så velg "delimited" før du går videre

The Text Wizard has determined that your data is Fixed Width.

If this is correct, choose Next, or choose the Data Type that best describes your data.

Original data type

Choose the file type that best describes your data:

- Delimited – Characters such as commas or tabs separate each field.
- Fixed width – Fields are aligned in columns with spaces between each field.

Start import at row: 1 File origin: Macintosh

Data preview

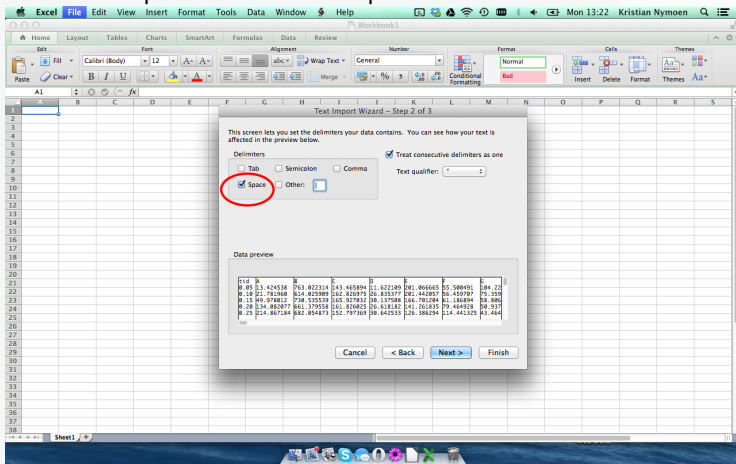
Preview of file UiO:Users:krisny:Documents:Research:Tea...QuantityOfMotion.txt.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	A	B	C	D	E	F	G	H												
1	tid	A	B	C	D	E	F	G	H											
2	0.05	13.424538	763.022314	143.465894	11.622109	201.066665	55.500491	104.22												
3	0.10	21.781960	614.025909	162.826975	26.835377	201.442057	56.459707	75.359												
4	0.15	49.978012	730.535539	165.927032	30.137508	166.701204	61.186834	58.806												
5	0.20	134.082077	661.379558	161.826025	26.618182	141.261835	79.464928	50.93												
6	0.25	214.867184	682.054873	152.797369	30.642533	126.386294	114.441325	43.4												

Cancel < Back Next > Finish

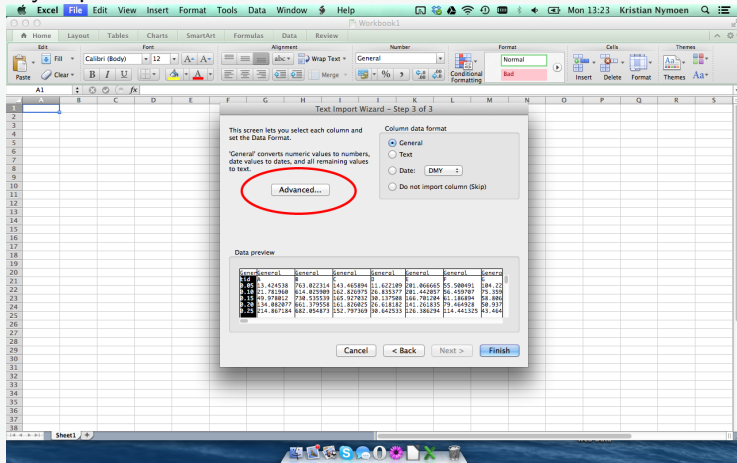
Excel (Mac)

Her må du spesifisere at det er space som skiller kolonnene



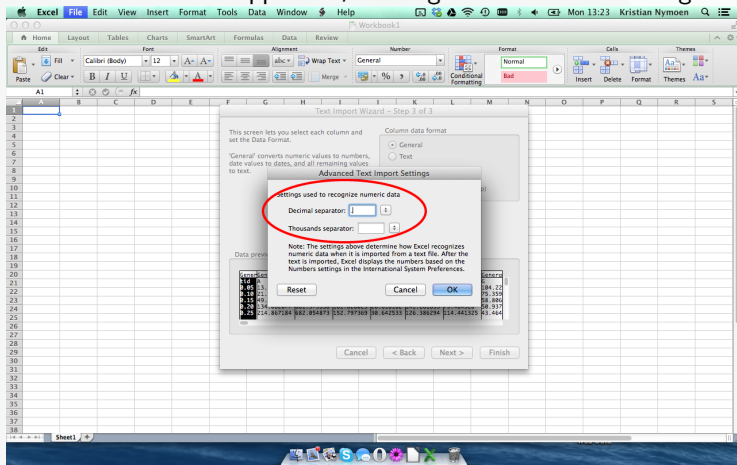
Excel (Mac)

Før du trykker finish må vi sjekke at riktig desimalseparator er valgt.
Trykk på "Advanced"



Excel (Mac)

Desimaltegnet i tekstfilen vår er punktum, så sjekk at det står et punktum i feltet eller rett det opp om nødvendig. Klikk deretter OK og Finish



Excel (Mac)

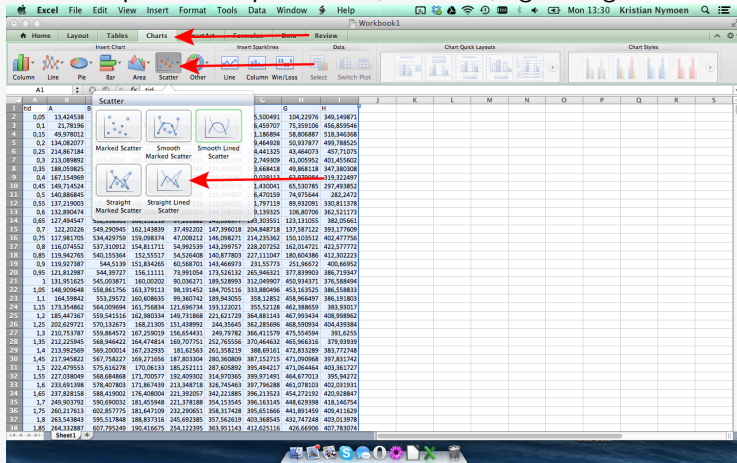
Når vi har dataene på plass kan vi markere alt sammen ved å holde inne shift, og deretter klikke på kolonne A og så I

The screenshot displays the Microsoft Excel application window on a Mac. The title bar reads 'Excel File Edit View Insert Format Tools Data Window Help'. The ribbon is set to 'Formulas', and the 'fx' button is active. The spreadsheet contains data in columns A through I. The data is as follows:

	A	B	C	D	E	F	G	H	I
1	od								
2	0.05	13,4324538	763,022314	343,465894	11,622109	201,066665	55,500491	104,229796	349,140871
3	0.1	21,78196	614,025909	362,826975	26,835377	201,442057	56,459707	75,359106	456,859546
4	0.15	49,978012	730,535539	365,927032	30,137508	166,701204	61,186894	58,806887	518,346368
5	0.2	134,082077	681,379558	361,826625	26,631881	141,261835	79,464628	50,937877	499,788525
6	0.25	214,867184	682,054873	352,797369	30,545253	126,386294	114,441325	43,464073	457,71075
7	0.3	213,089892	671,41233	350,508194	33,54175	118,522774	152,749309	41,005952	401,455602
8	0.35	188,059825	638,905114	353,366853	32,628583	123,930329	153,668418	49,868118	347,380308
9	0.4	167,154969	642,41787	354,058084	32,257871	123,570685	150,029113	62,979884	319,322497
10	0.45	140,714504	600,274762	353,304652	31,713293	120,433918	141,430041	63,530785	297,493862
11	0.5	140,886845	603,060407	355,506505	33,298915	115,854807	166,470159	74,975644	282,2472
12	0.55	137,219003	575,532833	360,140881	37,167528	122,864535	181,797119	89,932091	330,811378
13	0.6	132,890474	571,693685	364,183084	37,652287	144,108163	179,139325	106,80706	362,521173
14	0.65	127,495467	552,338561	366,152118	37,201882	143,098977	173,303551	123,110505	382,05661
15	0.7	122,20226	549,250945	362,343839	37,482027	147,396218	104,848718	137,587122	393,177609
16	0.75	117,981705	534,429759	359,098374	47,008212	146,098271	214,235362	150,103512	402,477756
17	0.8	116,074552	537,310912	354,811711	54,992539	143,299757	228,207252	162,014721	422,577772
18	0.85	119,942765	540,135364	352,555317	54,529408	140,877803	227,111047	180,604386	412,302223
19	0.9	119,927387	544,51309	353,834265	60,568703	143,466973	231,591779	251,86672	409,66992
20	0.95	121,812987	544,39727	356,111111	73,991054	173,526132	265,946321	377,839903	386,719347
21	1	131,951625	545,003871	360,00202	90,036271	189,528993	312,049907	450,934371	376,588494
22	1.05	148,009648	558,861756	363,379113	98,193452	184,705116	333,880496	451,163525	386,558833
23	1.1	164,58642	553,29572	360,698395	99,360742	189,340555	358,122851	458,964497	386,191809
24	1.15	173,354862	564,009684	361,756884	121,656734	193,122021	355,52128	462,388659	383,93017
25	1.2	185,447367	559,541516	362,980314	149,731868	221,621729	364,881143	467,993434	408,998962
26	1.25	202,629721	570,132673	368,21305	151,438992	244,35645	382,265696	468,590934	404,439384
27	1.3	210,373787	580,894519	367,359019	166,054431	249,78782	366,41379	475,534584	391,63255
28	1.35	212,225945	568,946422	364,474814	169,707751	252,765556	370,464632	465,566316	379,893939
29	1.4	213,992569	569,200014	367,232935	181,62563	263,382819	388,69161	472,833289	383,772748
30	1.45	217,945822	587,758227	369,371656	187,803004	280,360809	387,152715	473,090968	397,831742
31	1.5	222,429513	590,76118	370,1913	185,251111	287,058982	395,494217	471,064464	402,361727
32	1.55	227,038049	568,684868	371,700577	192,405302	314,970365	399,971491	464,670313	395,84272
33	1.6	233,691398	578,407803	371,867439	213,348718	326,745463	397,796288	461,078103	402,051931
34	1.65	237,828158	588,419002	376,490004	231,392057	342,221885	396,213523	454,272192	402,928847
35	1.7	249,803792	590,690031	381,855948	221,378188	354,335945	396,163145	448,633988	418,346249
36	1.75	260,217613	602,857775	381,847429	232,290651	358,317428	395,651666	441,891459	401,651629
37	1.8	263,543843	595,517848	388,837316	245,692385	357,562619	403,368545	432,747248	403,013978
38	1.85	264,332887	607,795249	390,616675	254,123595	363,951143	412,625116	426,66906	407,783074

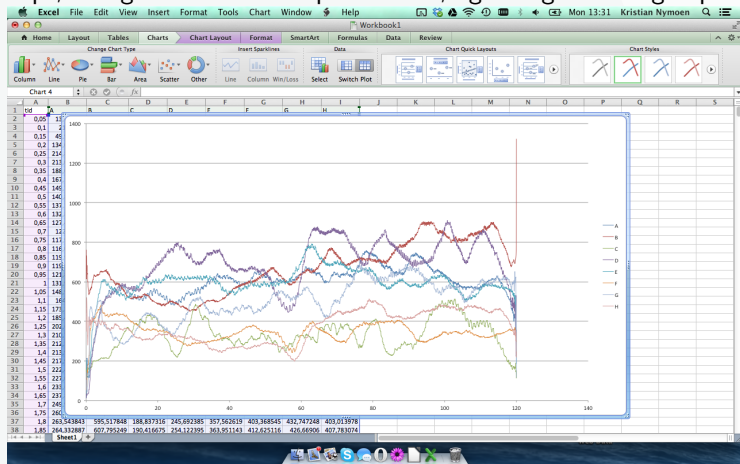
Excel (iMac)

For å få tidsverdiene på X-aksen og bevegelsesmengden på Y-aksen bruker vi Scatter plott. klikk på "Charts", "Scatter", og "Straight lined scatter"



Excel (Mac)

Vips, en figur som viser tid på X-aksen, og bevegelsesmengde på Y-aksen



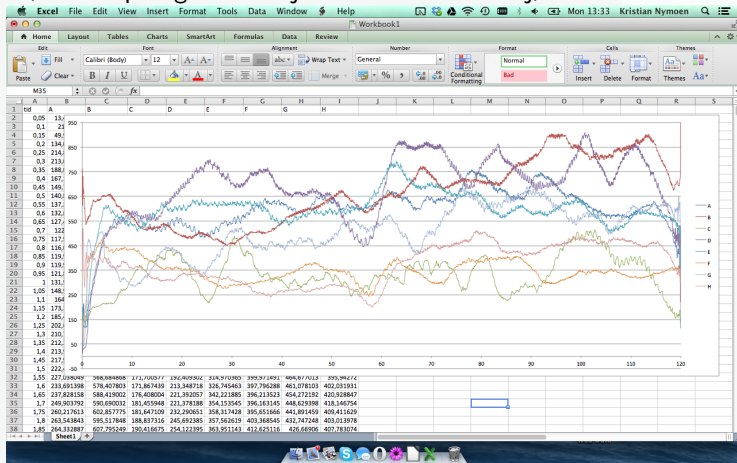
Excel (Mac)

Ved å velge aksene oppe til venstre og klikke “format selection” kan vi justere maksimum- og minimumsverdier for aksene. For eksempel er vi her bare interessert i området fra 0 til 120 sekunder.

The screenshot shows the Excel interface with a line chart. The 'Format Axis' dialog box is open, and the 'Scale' tab is selected. The 'Horizontal axis scale' is set to 'Auto'. The 'Maximum' value is set to 140.0, which is highlighted with a red arrow. The 'Minimum' value is 0.0, 'Major unit' is 20.0, and 'Minor unit' is 4.0. The 'Vertical axis crosses at' is 0.0. The 'Display units' are set to 'None'. The 'Logarithmic scale' is unchecked, and the 'Base' is 10.0. The 'Values in reverse order' and 'Vertical axis crosses at maximum value' options are also unchecked. The chart in the background shows several data series plotted over time, with the x-axis ranging from 0 to 140 seconds.

Excel (Mac)

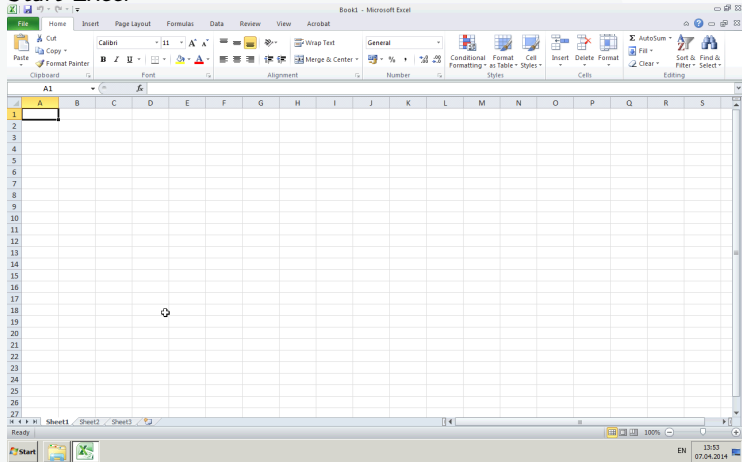
Størrelsen på figuren kan justeres ved å dra i hjørnene.



Excel (Windows)

Excel (Windows)

Start Excel



Excel (Windows)

Trykk på File → Open

The screenshot shows the Microsoft Excel 2010 interface. The title bar reads "Book1 - Microsoft Excel". The ribbon tabs are File, Home, Insert, Page Layout, Formulas, Data, Review, View, and Acrobat. The File menu is open, showing options: Save, Save As, Save as Adobe PDF, Open (highlighted with a mouse cursor), and Close. The left sidebar contains sections: Info, Recent, New, Print, Save & Send, Help, Options, and Exit. The main workspace is titled "Information about Book1" and contains three sections: "Permissions" (Protect Workbook), "Prepare for Sharing" (Check for Issues), and "Versions" (Manage Versions). On the right, there is a "Properties" section with sub-sections: Properties, Related Dates, and Related People. A small spreadsheet preview is visible in the top right of the main workspace. The Windows taskbar at the bottom shows the Start button, taskbar icons, and system tray with the time 13:54 and date 07.04.2014.

File Home Insert Page Layout Formulas Data Review View Acrobat

Save
Save As
Save as Adobe PDF
Open
Close

Info

Recent

New

Print

Save & Send

Help

Options

Exit

Information about Book1

Permissions
Anyone can open, copy, and change any part of this workbook.

Protect Workbook

Prepare for Sharing
Before sharing this file, be aware that it contains:
Document properties and author's name

Check for Issues

Versions
There are no previous versions of this file.

Manage Versions

Properties

Size Not saved yet
Title Add a title
Tags Add a tag
Categories Add a category

Related Dates
Last Modified Never
Created Today, 13:53
Last Printed Never

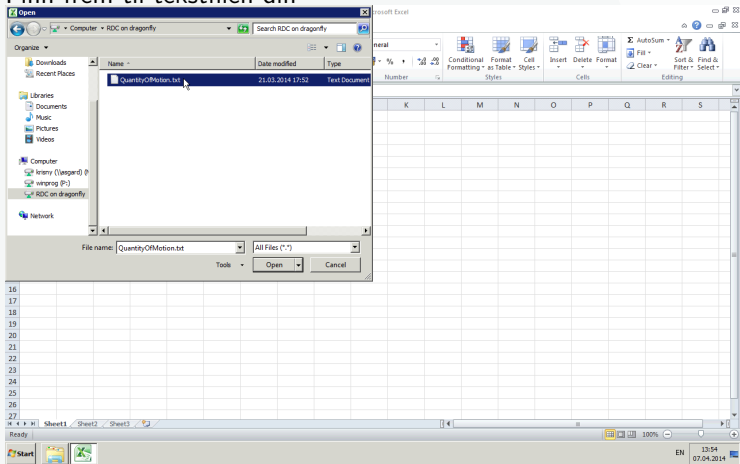
Related People
Author "krstny"
Add an author
Last Modified By Not saved yet

Show All Properties

EN 13:54 07.04.2014

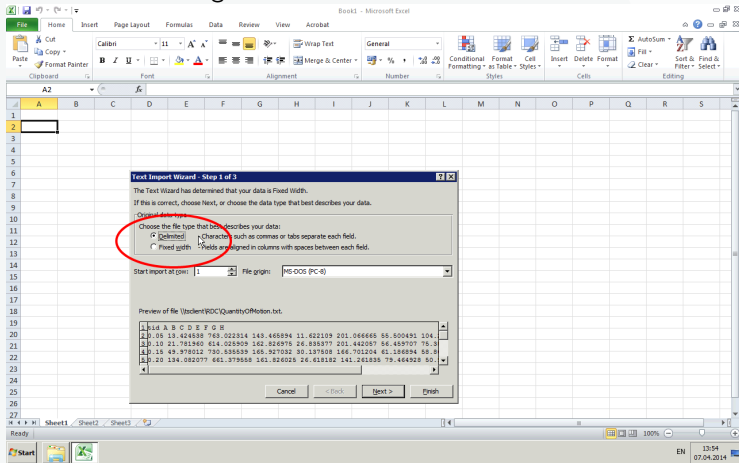
Excel (Windows)

Finn frem til tekstfilen din



Excel (Windows)

I denne tekstfilen er kolonnene skilt med et bestemt tegn (space), så velg "delimited" før du går videre



The screenshot shows the Microsoft Excel interface with the Text Import Wizard dialog box open. The dialog box is titled "Text Import Wizard - Step 1 of 3". It contains the following text:

The Text Wizard has determined that your data is Fixed Width.
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type:
Choose the file type that best describes your data:
 Delimited Characters such as commas or tabs separate each field.
 Fixed width Fields are aligned in columns with spaces between each field.

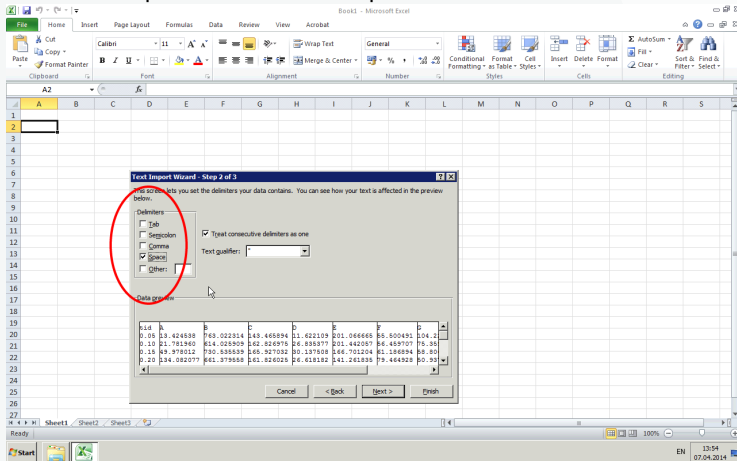
Start import at (row) 1 File origin: MS-OES (PC-8)

Preview of file \\jsocent\QOC\QuantityOfMotion.txt

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
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23																				
24																				
25																				
26																				
27																				

Excel (Windows)

Her må du spesifisere at det er space som skiller kolonnene



Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

- Tab
- Semicolon
- Comma
- Space
- Other:

Treat consecutive delimiters as one

Text qualifier:

Data preview

a	b	c	d	e	f	g	h
0.05	13.424538	763.022314	243.465894	11.622103	201.066665	55.500491	104.2
0.10	21.781940	814.025909	262.826975	26.895377	201.442057	66.4859707	75.36
0.16	49.379012	730.636639	265.927032	30.137408	266.701204	61.126894	86.80
0.20	134.082077	641.379558	261.826028	26.618182	241.241935	79.464928	80.93

Excel (Windows)

Før du trykker finish må vi sjekke at riktig desimalseparator er valgt.
Trykk på "Advanced"

The screenshot shows the Microsoft Excel interface with the 'Text Import Wizard - Step 3 of 3' dialog box open. The dialog box has a title bar with a close button. The main text reads: 'This screen lets you select each column and set the Data Format.' Below this, there is a section for 'Column data format' with three radio buttons: 'General' (selected), 'Text', and 'Date: DMY'. To the right of these options, a note states: 'General converts numeric values to numbers, date values to dates, and all remaining values to text.' A red circle highlights the 'Advanced...' button located below the note. Below the format options is a 'Data preview' section showing a grid of data with column headers 'General' and 'Date'. At the bottom of the dialog box are buttons for 'Cancel', '< Back', 'Next >', and 'Finish'.

Excel (Windows)

Desimaltegnet i tekstfilen vår er punktum, så sjekk at det står et punktum i feltet eller rett det opp om nødvendig. Klikk deretter OK og Finish

Text Import Wizard - Step 3 of 3

This screen lets you select each column and set the Data Format.

Column data format:

- General
- Text
- Date
- Do not import column

General converts numeric values to numbers, date values to dates, and all other values to text.

Advanced Text Import Settings

Settings used to recognize numeric data

General separator: [Dropdown menu]

Thousand separator: [Dropdown menu]

Note: Numbers will be displayed using the numeric settings specified in the Regional Settings control panel.

Trailing zeros for negative numbers

Data preview:

General	Number
0.05	33.424538
0.18	21.781360
0.18	49.978012
0.20	134.082077

Excel (Windows)

Når vi har dataene på plass kan vi markere alt sammen ved å holde inne shift, og deretter klikke på kolonne A og så I

The screenshot displays the Microsoft Excel interface with a spreadsheet titled "QuantityOfMotion.tld". The ribbon is set to the "Home" tab, showing options for Font, Paragraph, Styles, Cells, and Editing. The spreadsheet contains data in columns A through I, with row 1 labeled "tid" and columns A through I labeled "A" through "I". The data in column A ranges from 0.05 to 1.25, and the data in column I ranges from 349,1499 to 391,6252. The status bar at the bottom shows "Average: 462,8266977", "Count: 21609", and "Sum: 9997056,669".

	A	B	C	D	E	F	G	H	I
1	tid								
2	0,05	13,42454	763,0223	143,4659	11,62211	201,0667	55,50049	104,2298	349,1499
3	0,1	21,78196	614,0259	162,8227	26,83538	201,4421	56,45971	75,35911	456,8595
4	0,15	49,97801	730,5355	165,927	30,13751	166,7012	61,18689	58,80689	518,3464
5	0,2	134,0821	661,3796	161,826	26,61818	141,2618	79,46493	50,93788	99,7885
6	0,25	214,8672	682,0549	152,7974	30,64253	126,3863	114,4413	43,46407	457,7108
7	0,3	213,0899	671,4123	150,5082	33,54175	118,5228	152,7493	41,00595	401,4556
8	0,35	188,0598	638,9051	153,3669	32,62858	123,9303	153,6684	49,86812	347,3803
9	0,4	167,155	642,8179	154,0581	32,25787	123,5707	150,0291	62,97998	319,3225
10	0,45	149,7145	600,2748	153,3041	31,71239	120,4239	141,43	65,53079	297,4939
11	0,5	140,8868	603,0604	155,5065	33,29892	115,8548	166,4702	74,97564	282,2472
12	0,55	137,219	575,5328	160,1409	37,16753	122,8645	181,7971	89,93209	330,8114
13	0,6	132,8905	571,6937	164,1831	37,65227	144,1082	179,1393	106,8071	362,5212
14	0,65	127,4945	552,3586	166,1521	37,20188	143,099	193,3036	123,1311	382,0566
15	0,7	122,2023	549,2909	162,1438	37,4922	147,396	204,8487	137,5871	393,1776
16	0,75	117,9817	534,4298	159,0984	47,00821	146,0983	214,2354	150,1035	402,4778
17	0,8	116,0746	537,3109	154,8117	54,99254	143,2998	228,2073	162,0147	422,5778
18	0,85	119,9428	540,1554	152,5552	54,52841	140,8778	227,111	180,6044	412,3022
19	0,9	119,9274	544,5139	151,8343	60,5687	143,467	231,5577	251,9667	400,6695
20	0,95	121,813	544,3973	156,1111	73,99105	173,5261	265,9463	377,8399	386,739
21	1	131,9516	545,0039	160,902	90,03627	189,529	312,0499	450,9344	376,5885
22	1,05	148,9096	558,8618	163,3791	98,19145	184,7051	333,8805	453,1635	386,5588
23	1,1	164,5984	553,2957	160,6086	99,36074	189,9431	358,1285	458,9665	386,1918
24	1,15	173,3549	564,0097	161,7968	121,6967	193,122	355,5213	462,3887	383,9302
25	1,2	185,4474	559,5415	162,9803	149,7319	221,6217	364,8811	467,9934	408,999
26	1,25	202,6297	570,1327	168,2131	151,439	244,3565	362,2857	468,5909	404,4394
27	1,3	210,7538	559,8646	167,259	156,6544	249,7978	366,4116	475,5546	391,6252

Excel (Windows)

For å få tidsverdiene på X-aksen og bevegelsesmengden på Y-aksen bruker vi Scatter plot. klikk på "Insert", "Scatter", og "Scatter with straight lines"

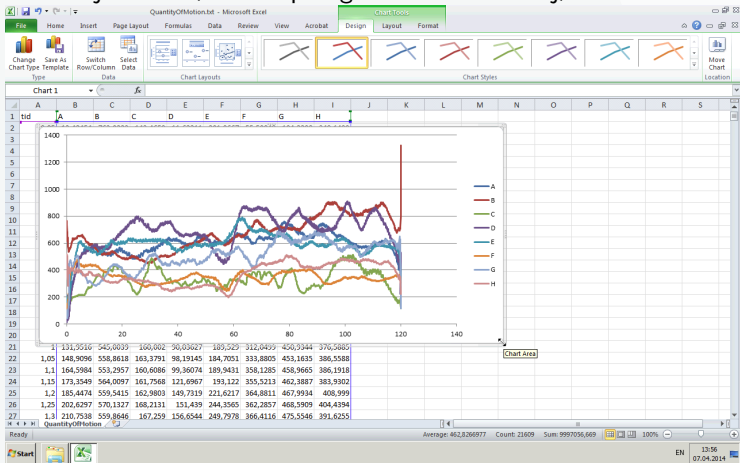
The screenshot shows the Microsoft Excel interface with a data table and the 'Scatter with Straight Lines' chart option selected. The data table is as follows:

	A	B	C	D	E	F	G	H	
1	tid								
2	0,05	13,42454	763,0223	143,4659	11,62211	201,0667	55,50049	104,2298	349,
3	0,1	21,78196	614,0259	162,827	26,83538	201,4421	56,45971	75,35911	456,
4	0,15	49,97801	730,5355	165,927	30,13751	166,7012	61,18689	58,80689	518,
5	0,2	134,0821	661,3796	161,826	26,61818	141,2618	79,46493	50,93788	499,
6	0,25	214,8672	682,0549	152,7974	30,64253	126,3863	114,4413	43,46407	457,
7	0,3	213,0899	671,4123	150,5082	33,54175	118,5228	152,7493	41,00595	401,
8	0,35	188,0598	638,9051	153,3669	32,62858	123,9303	153,6684	49,86812	347,89
9	0,4	167,155	642,8179	154,0581	32,25787	123,5707	150,0291	62,97998	319,32
10	0,45	149,7145	600,2748	153,3041	31,71239	120,4239	141,43	65,53079	297,49
11	0,5	140,8868	603,0604	155,5065	33,29892	115,8548	166,4702	74,97564	282,24
12	0,55	137,219	575,5328	160,1409	37,16753	122,8645	181,7971	89,92209	330,8114
13	0,6	132,8905	571,6937	164,1831	37,65227	144,1082	179,1393	106,8071	362,5213
14	0,65	127,4945	552,3586	166,1521	37,20188	143,099	193,3036	123,1311	382,0566
15	0,7	122,2023	549,2909	162,1438	37,4922	147,396	204,8487	137,5871	393,1776
16	0,75	117,9817	534,4298	159,0984	47,00821	146,0983	214,2354	150,1025	402,4778
17	0,8	116,0746	537,3109	154,8117	54,99254	143,2998	228,2073	162,0147	422,5778
18	0,85	119,9428	540,1554	152,5552	54,52841	140,8778	227,111	180,6044	412,3022
19	0,9	119,9274	544,5139	151,8343	60,5687	143,467	231,5577	251,9667	400,6695
20	0,95	121,813	544,3973	156,1111	73,99105	173,5261	265,9463	377,8399	386,739
21	1	131,9516	545,0039	160,902	90,03627	189,529	312,0499	450,9344	376,5885
22	1,05	148,9096	558,8618	163,3791	98,19145	184,7051	333,8805	453,1635	386,5588
23	1,1	164,5984	553,2957	160,6086	99,36074	189,9431	358,1285	458,9665	386,1918
24	1,15	173,3549	564,0097	161,7968	121,6967	193,122	355,5213	462,3887	383,9302
25	1,2	185,4474	559,5415	162,9803	149,7319	221,6217	364,8811	467,9934	408,999
26	1,25	202,6297	570,1327	168,2131	151,439	244,3565	362,2857	468,5909	404,4394
27	1,3	210,7938	559,8646	167,259	156,6544	249,7978	366,4116	475,5546	391,6255

The 'Scatter with Straight Lines' tooltip is visible, stating: "Compare pairs of values. Use it when there are many data points in x-axis order and the data represents separate samples."

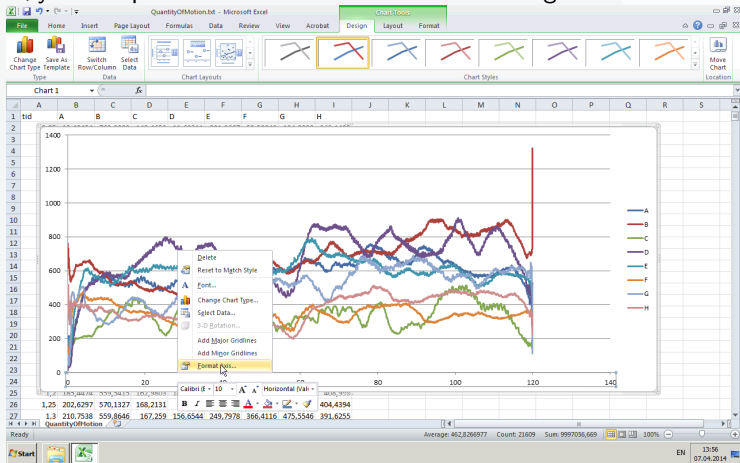
Excel (Windows)

Du kan justere størrelsen på figuren ved å dra i hjørnene



Excel (Windows)

Høyreklikk på X-aksen for å endre maksimum- og minimumverdi.



Excel (Windows)

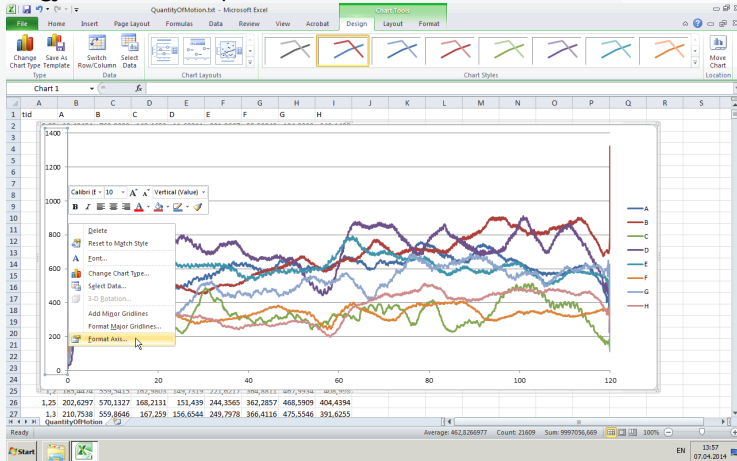
Vi setter maksimum til 120 sekunder

The screenshot shows the Microsoft Excel interface with a line chart titled 'Chart 1'. The chart displays multiple data series (A-H) over time. The 'Format Axis' task pane is open, and the 'Axis Options' section is selected. The 'Maximum' value is set to 120,0, which is circled in red. The 'Major unit' is set to 20,0, and the 'Minor unit' is set to 4,0. The 'Display units' are set to 'None'. The 'Major tick mark type' is 'Outside', and the 'Minor tick mark type' is 'None'. The 'Axis labels' are set to 'Next to Axis'. The 'Vertical axis crosses' are set to 'Automatic'. The 'Axis value' is set to 120. The 'Maximum axis value' is also set to 120. The 'Close' button is visible at the bottom of the task pane.

Time	A	B	C	D	E	F
1.25	202,6297	570,1327	166,2131	151,439	244,3565	362,2857
1.3	210,7538	559,8646	167,259	156,6544	249,7978	366,4116

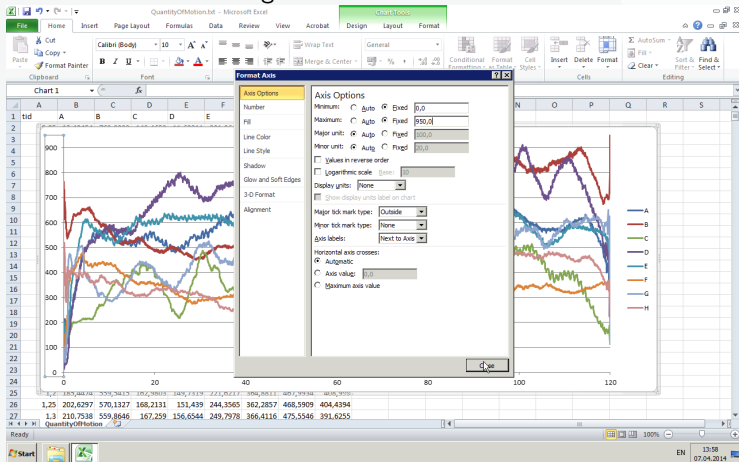
Excel (Windows)

Vi gjør det samme på Y-aksen



Excel (Windows)

Setter minimum til 0 og maksimum til 950



Excel (Windows)

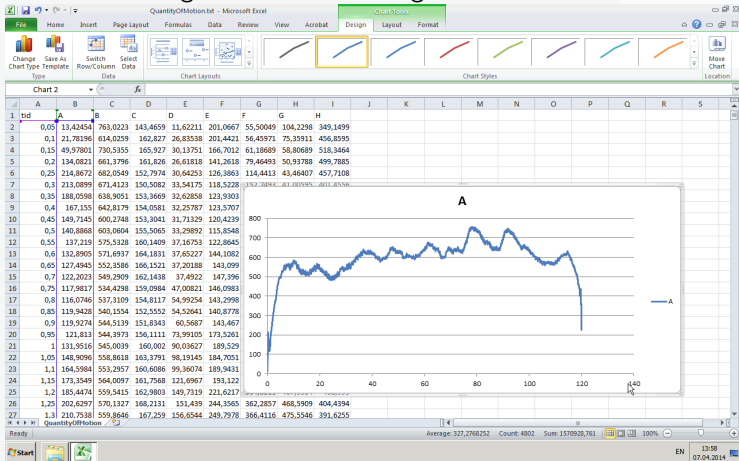
Hvis du vil plote bare én kolonne (f.eks. kolonne A), velg bare denne (og tidsaksen) i første steg.

The screenshot shows the Microsoft Excel interface with the 'Formulas' ribbon active. The 'Columns' group in the ribbon has the 'Column' icon selected, and a mouse cursor is hovering over it. In the worksheet, column A is highlighted in blue, indicating it is selected. The data in column A consists of numerical values from 0.05 to 1.25. The status bar at the bottom shows 'Average: 327,2768252 Count: 4802 Sum: 1570928,761'.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	tid																		
2	0,05	13,42454	763,0223	143,4659	11,62211	201,0667	55,50049	104,2298	349,1499										
3	0,1	21,78196	614,0239	162,827	26,83538	201,4421	56,45971	75,35911	456,8595										
4	0,15	49,97801	730,5355	165,927	30,13751	166,7012	61,18689	58,80689	518,3464										
5	0,2	134,0821	661,3796	161,626	26,61818	141,2618	79,46493	50,93788	499,7885										
6	0,25	214,8672	682,0549	152,7974	30,64253	126,3863	114,4113	43,46407	457,7108										
7	0,3	213,0899	671,4123	150,5082	33,54175	118,5228	152,7493	41,00595	401,4556										
8	0,35	188,0598	638,9051	153,3669	32,62858	123,9303	153,6684	49,86812	347,3803										
9	0,4	167,155	642,8179	154,0581	32,25787	123,5707	150,0291	62,97998	319,3225										
10	0,45	149,7145	600,2748	153,3041	31,71329	120,4239	141,43	65,53079	297,4939										
11	0,5	140,8868	603,0604	155,5065	33,29892	115,8548	166,4702	74,97564	282,2472										
12	0,55	137,219	575,5328	160,1409	37,16753	122,8645	181,7971	89,93209	330,8114										
13	0,6	132,8905	571,6937	164,1831	37,65227	144,1082	179,1393	106,8071	362,5212										
14	0,65	127,4945	552,3586	166,1521	37,20188	143,099	199,3036	123,1311	382,0566										
15	0,7	122,2023	549,2909	162,1438	37,4922	147,396	204,8487	137,5871	393,1776										
16	0,75	117,9817	534,4298	159,0984	47,00821	146,0983	214,2354	150,1035	402,4778										
17	0,8	116,0746	537,3109	154,8117	54,99254	143,2998	228,2073	162,0147	422,5778										
18	0,85	119,9428	540,1554	152,5552	54,52641	140,8778	227,1111	180,6044	412,3022										
19	0,9	119,9274	544,5139	151,8343	60,5687	143,467	231,5577	251,9667	400,6695										
20	0,95	121,813	544,3973	156,1111	73,99105	173,5261	265,9463	377,8399	386,7193										
21	1	131,9516	545,0039	160,002	90,03627	189,529	312,0499	450,9344	376,5885										
22	1,05	148,9096	558,8618	163,3791	98,19145	184,7051	333,8805	453,1635	386,5588										
23	1,1	164,5984	553,2957	160,6086	99,36074	189,9431	358,1285	458,9665	386,1918										
24	1,15	173,3549	564,0097	161,7568	121,6967	193,122	355,5213	462,3887	383,9302										
25	1,2	185,4474	559,5415	162,9803	149,7319	221,6217	364,8811	467,9934	408,999										
26	1,25	202,6297	570,1327	168,2131	151,439	244,3565	362,2857	468,5909	404,4394										
27	1,3	210,7938	559,8646	167,259	156,6544	249,7978	366,4116	475,5546	391,6255										

Excel (Windows)

Dette er som regel litt mer oversiktlig

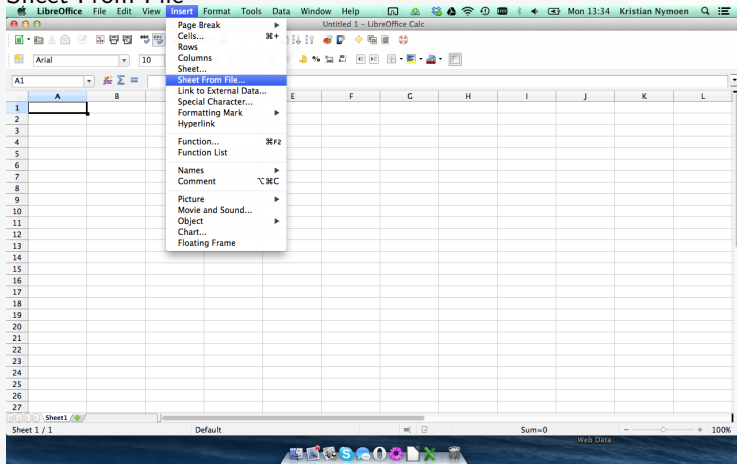


LibreOffice (Mac)

(ganske lik fremgangsmåte som OpenOffice)

LibreOffice (Mac)

For å importere dataene fra tekstfilen, start med å trykke på Insert → Sheet From File



LibreOffice (Mac)

Datakolonnene våre er delt opp med space, så velg dette

Text Import - [QuantityOfMotion.txt]

Import

Character set: Unicode (UTF-8)

Language: Default - Unknown

From row: 1

Separator options

- Fixed width
- Separated by
 - Tab
 - Semicolon
 - Merge delimiters
 - Comma
 - Space
 - Other

Text delimiter: [v]

Other options

- Quoted field as text
- Detect special numbers

Fields

Column type: [v]

	Standard	Standard	Standard	Standard	Standard	Standard	Star
1	0.10	A	B	C	D	E	F
2	0.05	13.424538	743.022314	143.465894	11.622109	201.066665	55.
3	0.10	21.781360	614.025909	162.826975	26.835377	201.442057	56.
4	0.15	49.978012	730.535539	165.927032	30.137508	166.701204	61.
5	0.20	134.082077	661.379558	161.826025	26.618182	141.261835	79.
6	0.25	214.867184	682.054873	152.797369	30.642533	126.386294	114
7	0.30	213.089892	671.412330	150.598194	33.541750	118.522774	152
8	0.35	188.059825	638.905114	153.366853	32.628583	123.930329	153

LibreOffice (Mac)

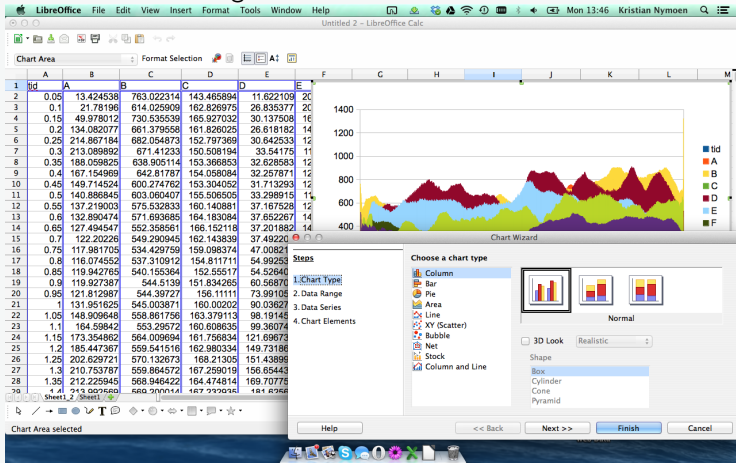
Når dataene er importert, velg alle kolonnene ved å trykke på A og så I mens du holder inne Shift-tasten. Trykk deretter på det lille "chart" ikonet øverst, eller velg Insert → Chart fra menyen.

The screenshot shows the LibreOffice Calc application window. The menu bar at the top includes File, Edit, View, Insert, Format, Tools, Data, Window, and Help. The toolbar below the menu bar contains various icons, including a small red icon with a white bar chart, which is highlighted by a black arrow. The main workspace displays a spreadsheet with columns A through M and rows 1 through 28. The data in the spreadsheet is as follows:

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	tid												
2	0.05	13.424538	763.022314	143.465894	11.622109	201.066665	55.500491	704.22976	349.149871				
3	0.1	21.78196	614.025909	162.826975	26.835377	201.442057	56.459707	75.341106	456.859546				
4	0.15	49.978012	730.535539	165.927032	30.137508	166.701204	61.186894	58.806847	518.346368				
5	0.2	134.062077	661.379558	161.826025	26.618182	141.261835	79.464928	50.937877	399.788021				
6	0.25	214.867184	682.054873	152.797369	30.642533	126.386294	114.441325	43.464073					
7	0.3	213.089892	671.41233	150.508194	33.54175	118.522774	152.749309	41.005952					
8	0.35	188.059825	638.905114	153.366853	32.628583	123.930329	153.668418	49.868118					
9	0.4	167.154969	642.81787	154.058084	32.257871	123.570685	150.029113	62.979984	319.36601				
10	0.45	149.714524	600.274762	153.304052	31.713293	120.423918	141.430041	65.530785	297.493852				
11	0.5	140.886845	603.060407	155.506505	33.298915	115.854807	166.470159	74.975644	282.2472				
12	0.55	137.219003	575.532833	160.140881	37.167528	122.864535	181.797119	89.932091	330.811378				
13	0.6	132.890474	571.693685	164.183084	37.652267	144.108163	179.139325	106.80706	362.521173				
14	0.65	127.494547	552.356561	166.152118	37.201882	143.098977	193.303551	123.131055	382.05661				
15	0.7	122.20226	549.290945	162.143839	37.492202	147.396018	204.848718	137.587122	393.177609				
16	0.75	117.981705	534.429759	159.098374	47.008212	146.098271	214.235362	150.103512	402.477756				
17	0.8	116.074552	537.310912	154.811711	54.992539	143.299757	228.207252	162.014721	422.577772				
18	0.85	119.942765	540.155364	152.55517	54.526408	140.877803	227.111047	180.604386	412.302223				
19	0.9	119.927387	544.5139	151.834285	60.568701	143.468973	231.55773	251.96672	400.86952				
20	0.95	121.812987	544.39727	156.11111	73.991054	173.526132	265.946321	377.839903	386.719347				
21	1	131.951625	545.003871	160.00202	90.036271	189.528993	312.049907	450.934371	376.588494				
22	1.05	148.909648	558.861756	163.379113	98.191452	184.705116	333.880496	453.163525	386.558933				
23	1.1	164.59842	553.29627	160.608635	99.380742	189.943055	358.12852	458.966497	386.191803				
24	1.15	173.354862	560.009694	161.756834	121.696734	193.122021	355.52128	462.388659	383.93017				
25	1.2	185.447367	559.541516	162.980334	149.731868	221.621729	364.881143	467.993434	408.98962				
26	1.25	202.629721	570.132673	168.21305	151.438992	244.35645	362.285696	468.590934	404.439384				
27	1.3	210.753787	558.864572	167.259019	156.654431	249.79782	366.411579	475.554594	391.6255				
28	1.35	212.225945	568.946422	164.474814	169.707751	252.765556	370.464632	465.966316	379.93939				

LibreOffice (Mac)

NB. Hvis du har mye data kan det ta litt tid å lage figuren, så gi det et minutt om nødvendig.



LibreOffice (Mac)

Trykk på "XY (Scatter)" og velg en plottype med "lines only".

The screenshot shows the LibreOffice Calc interface with a data table and the Chart Wizard dialog box. The data table is as follows:

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	tid	A	B	C	D	E							
2	0.05	13.424538	763.022314	143.465894	11.622109	20							
3	0.1	21.78196	614.025909	162.826975	26.835377	20							
4	0.15	49.978012	730.535539	165.927032	30.137508	16							
5	0.2	134.082077	661.379558	161.826025	26.618182	14							
6	0.25	214.867184	682.054873	152.797369	30.642533	12							
7	0.3	213.089892	671.41233	150.508194	33.54175	11							
8	0.35	188.059825	638.905114	153.366853	32.628583	12							
9	0.4	167.154969	642.81787	154.058084	32.257871	12							
10	0.45	149.714524	600.274762	153.304052	31.713293	12							
11	0.5	140.886845	603.060407	155.506505	33.298915	11							
12	0.55	137.219003	575.532833	160.140881	37.167528	14							
13	0.6	132.890474	571.693685	164.183084	37.652267	14							
14	0.65	127.494547	552.358561	166.152116	37.201882	14							
15	0.7	122.20226	549.290945	162.143839	37.49220	14							
16	0.75	117.981705	534.429759	158.098374	47.00821	14							
17	0.8	116.074552	537.310912	154.811711	54.99253	14							
18	0.85	119.942785	540.155364	152.55517	54.52640	14							
19	0.9	119.927387	544.5139	151.834265	60.56870	14							
20	0.95	121.812987	544.39727	156.11111	73.99105	14							
21	1	131.951625	545.003871	160.00202	90.03627	14							
22	1.05	148.909648	558.861756	163.379113	98.19145	14							
23	1.1	164.59842	553.29572	160.608635	99.36074	14							
24	1.15	173.354862	564.009694	161.756834	121.69673	14							
25	1.2	185.447367	559.541516	162.980334	149.73186	14							
26	1.25	202.629721	570.132673	168.21305	151.43899	14							
27	1.3	210.753787	559.864572	167.259019	156.65443	14							
28	1.35	212.225945	568.946422	164.474814	169.70775	14							
29	1.4	213.007580	569.200014	167.220034	181.82664	14							

The Chart Wizard dialog box is open, showing the 'XY (Scatter)' chart type selected. The 'Lines Only' option is selected under 'Choose a chart type'. The 'Smooth lines' and 'Sort by X values' options are unchecked. The 'Finish' button is highlighted.

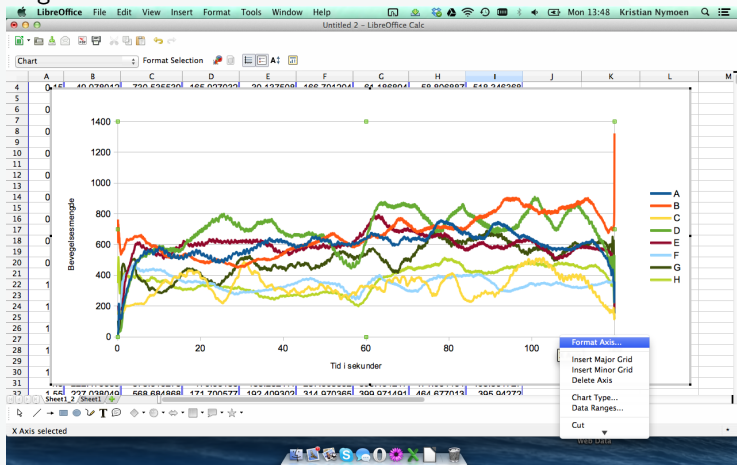
Ved å trykke på “chart elements” kan du navngi aksene

The screenshot shows the LibreOffice Calc interface with a line chart and the Chart Wizard dialog box open. The chart displays eight data series (A-H) over time. The X-axis is labeled 'Tid i sekunder' and the Y-axis is labeled 'Bevegelsesmengde'. The Chart Wizard dialog box is currently on the '4. Chart Elements' step, where the X-axis is named 'Tid i sekunder' and the Y-axis is named 'Bevegelsesmengde'. The 'Display legend' checkbox is checked, and the legend is positioned on the right side of the chart.

Tid	A	B	C	D	E
0.05	13.424538	763.022314	143.465894	11.622109	20
0.1	21.78196	614.025909	162.826975	26.835377	20
0.15	49.978012	730.535539	165.927032	30.137508	16
0.2	134.082077	661.379558	161.826025	26.618182	14
0.25	214.867184	682.054873	152.797369	30.642533	12
0.3	213.089892	671.41233	150.508194	33.54175	11
0.35	188.059825	638.905114	153.366853	32.628583	12
0.4	167.154969	642.81787	154.058084	32.257871	12
0.45	149.714524	600.274762	153.304052	31.713293	14
0.5	140.886845	603.060407	155.506505	33.298915	14
0.55	137.219003	575.532833	160.140881	37.167528	12

LibreOffice (Mac)

For å sette maksimum- og minimumsverdi for aksene høyreklikker du og velger "format axis"



LibreOffice (Mac)

Vi setter X-aksens rekkevidde til 0-120 sekunder

The screenshot shows the LibreOffice Calc application window on a Mac. The title bar reads "LibreOffice File Edit View Insert Format Tools Window Help" and "Untitled 2 - LibreOffice Calc". The status bar at the bottom indicates "X Axis selected".

The main window displays a spreadsheet with a line chart. The Y-axis is labeled "Blevgelesmengde" and ranges from 0 to 1400. The X-axis is labeled "X Axis" and ranges from 0 to 120. The chart contains eight data series labeled A through H, represented by different colored lines. A legend on the right side of the chart identifies the series: A (blue), B (orange), C (yellow), D (green), E (red), F (light blue), G (dark green), and H (light green).

A "Scale" dialog box is open over the chart, with the "X Axis" tab selected. The dialog box has the following settings:

- Scale
- Reverse direction
- Logarithmic scale
- Minimum: 0 Automatic
- Maximum: 120 Automatic
- Major interval: 20 Automatic
- Minor interval count: 2 Automatic

The dialog box has "OK", "Cancel", "Help", and "Reset" buttons at the bottom.

LibreOffice (Mac)

