



INTERNET OF SPORTS:

HOW TO WIN GOLD MEDALS IN THE NEXT OLYMPICS IN XC-SKIING?

Christer Norström, CEO
www.sics.se

Technique





MOTORIC ELDORADO



Classical & Free technique

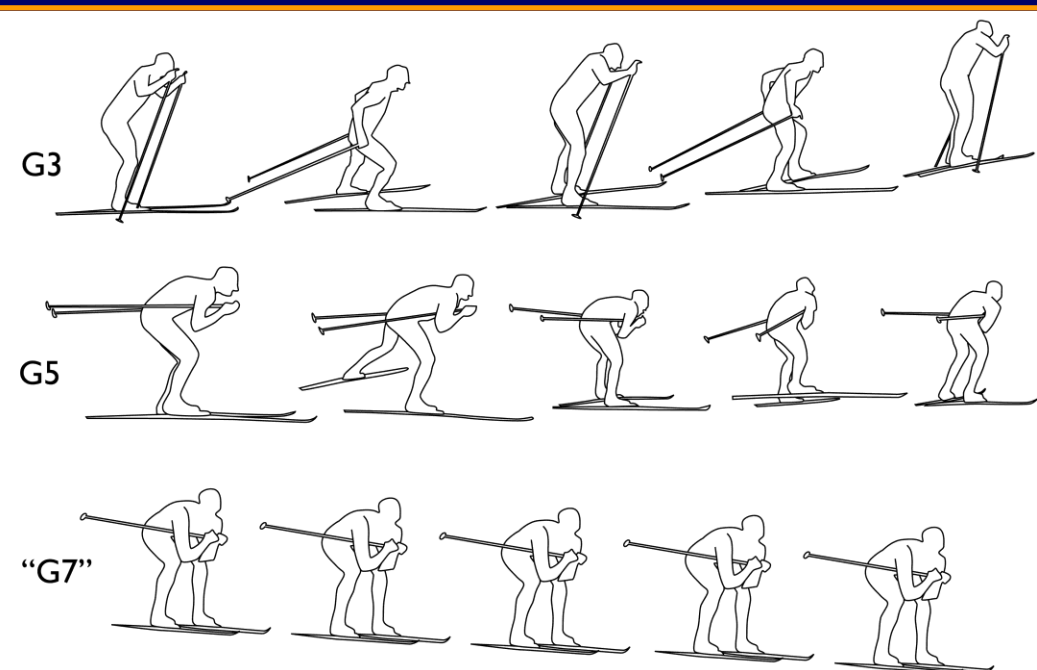
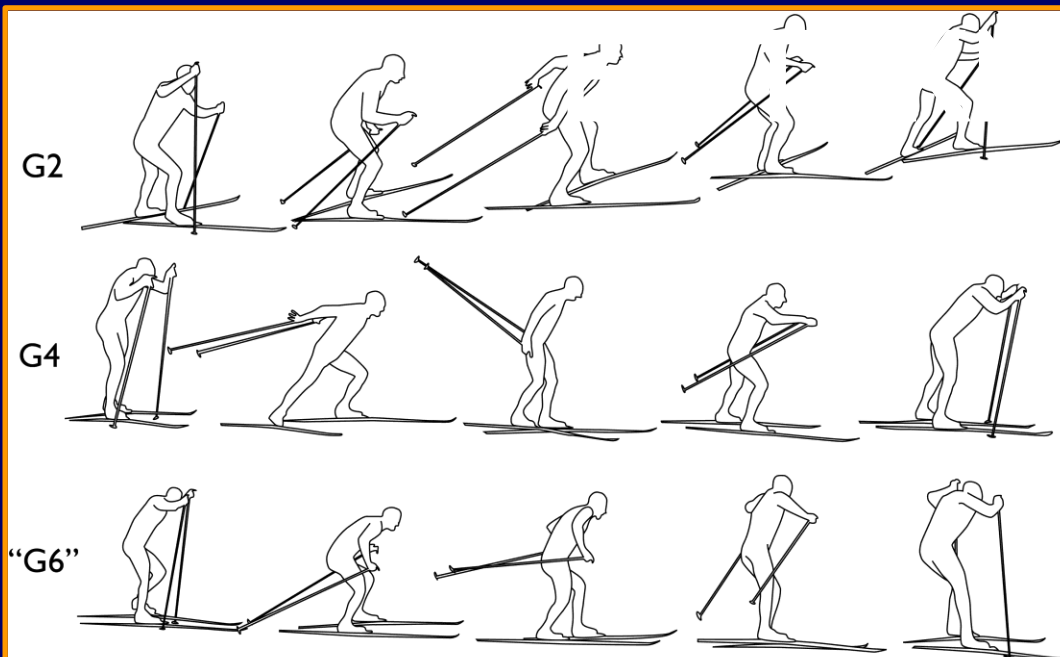
Varying terrain and conditions

Multiple techniques with frequent transitions

Different involvement upper body and legs

Physiological & Biomechanical Challenge

FREE TECHNIQUE



1.5 K SPRINT= 20-34 transitions
10 K = 100-150 transitions

Max. speed: 12.8 m s^{-1}

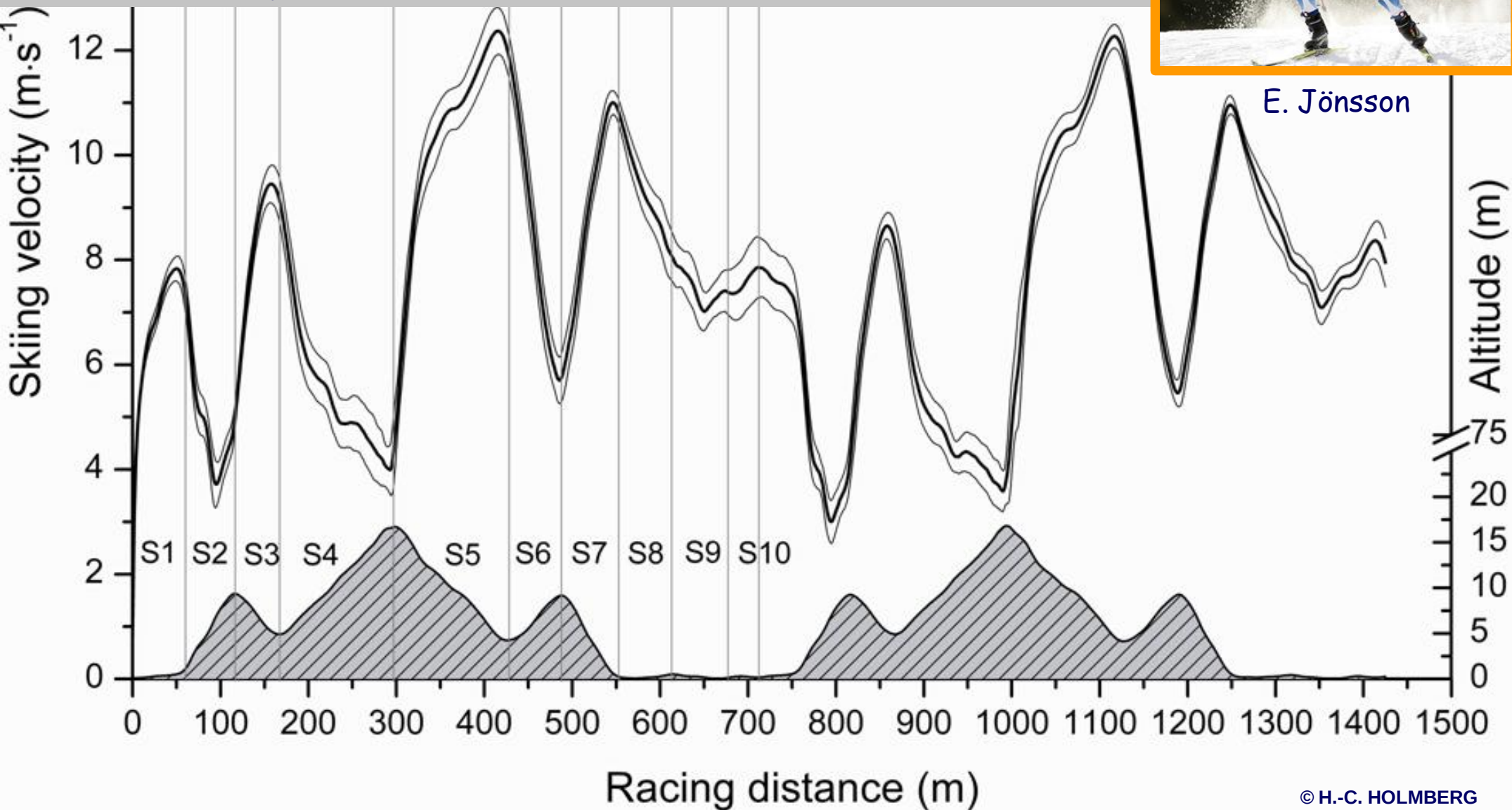
Min. speed: 2.9 m s^{-1}

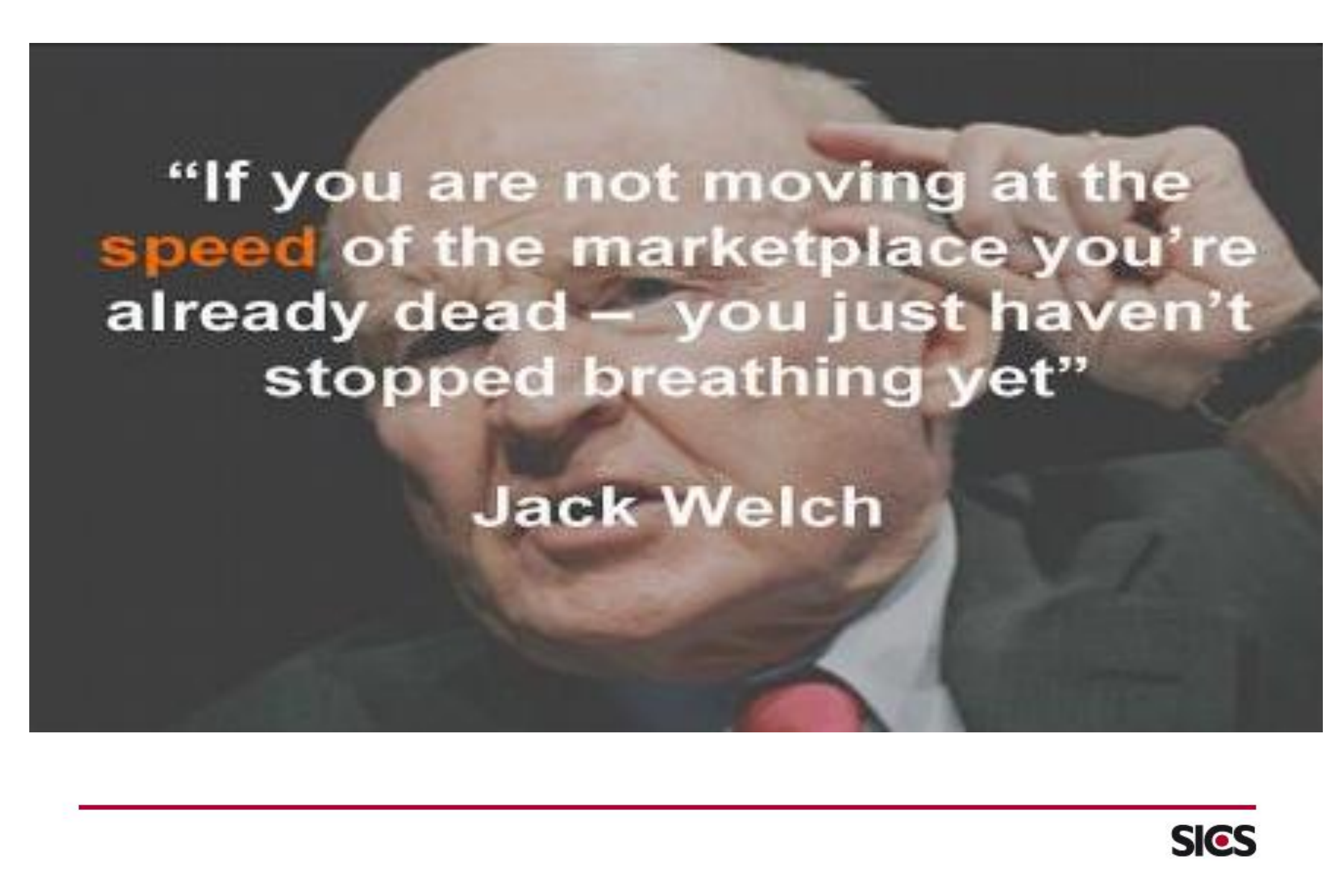
Average speed: $\sim 8 \text{ m s}^{-1}$

Sprint race



E. Jönsson



A close-up photograph of Jack Welch, an older man with a balding head and a serious expression. He is wearing a dark suit jacket, a white shirt, and a red tie. His right hand is raised to his forehead, with his index finger pointing upwards. The background is dark and out of focus.

“If you are not moving at the **speed** of the marketplace you’re already dead – you just haven’t stopped breathing yet”

Jack Welch

My understanding of the skiing market place

Parameters

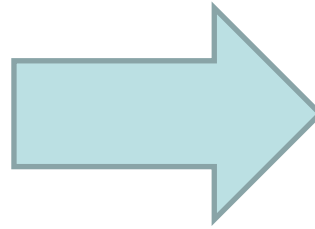
- Training techniques and methodology
- Material
 - Skis
 - Stiffness
 - Bindings
 - Structure
 - Waxes and waxing methods
 - Poles
 - Length, stiffness, ...
 - Shoes,
- **Biomechanics - Skiing technique**
- Physiology
- Ways of working

Competitors

- Norway
- Russia
- Finland
- Germany
- Italy
- ...

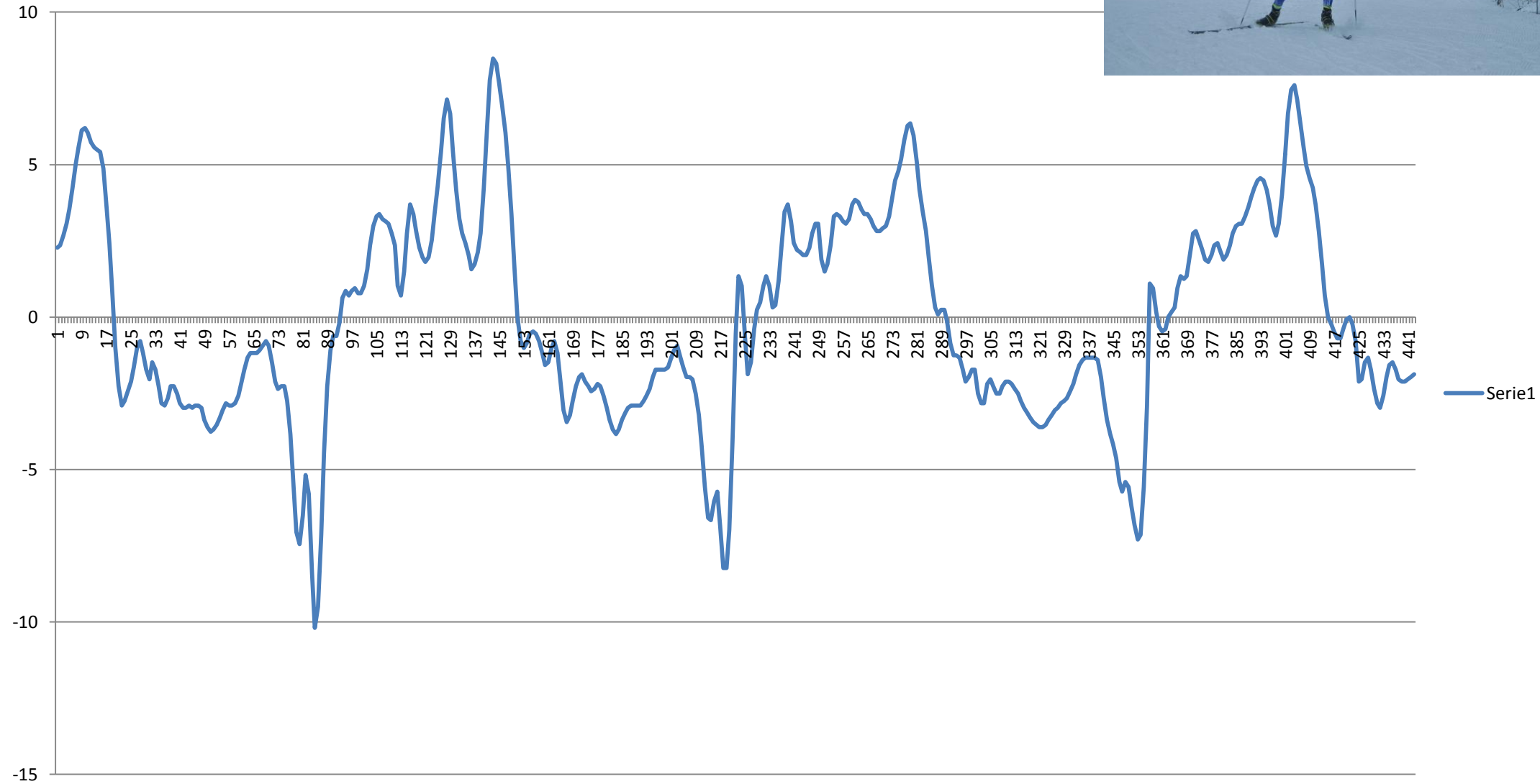
Dependent on each other...

The XC-trainer from the lab to the field

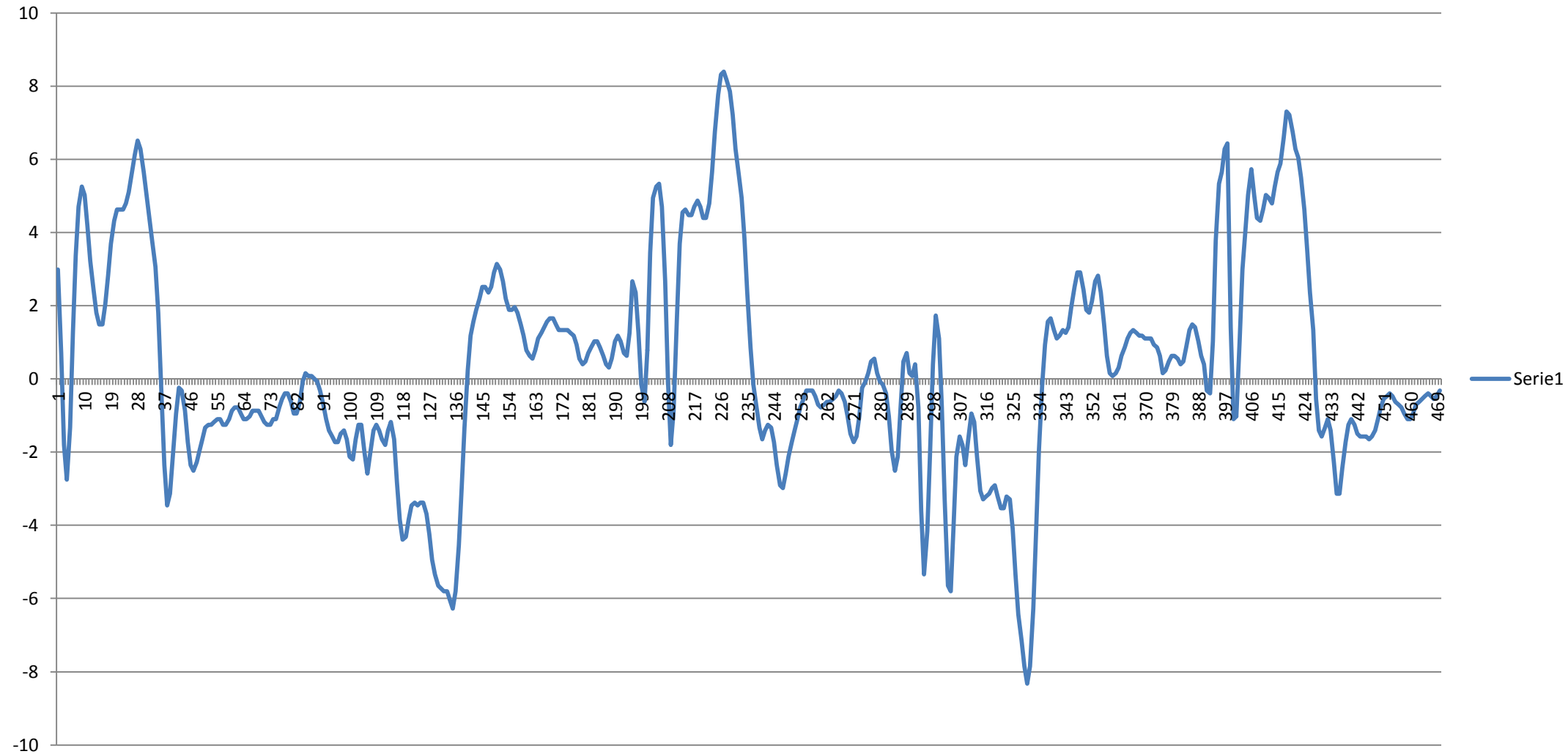


S

Gear 2 accelerations left/right

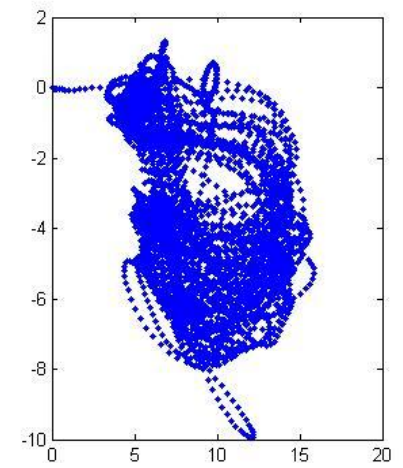
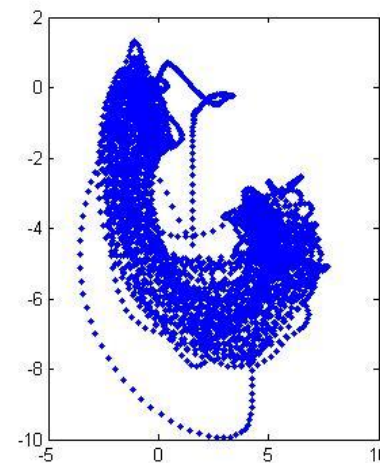
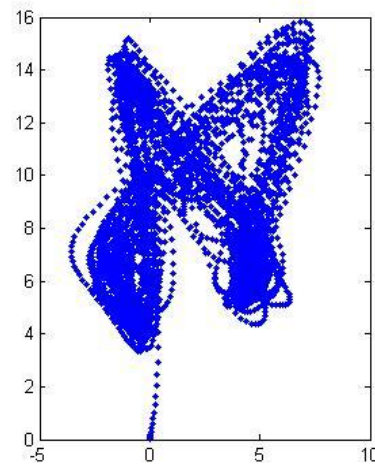


Gear 3 acceleration left/ right (Hampus)

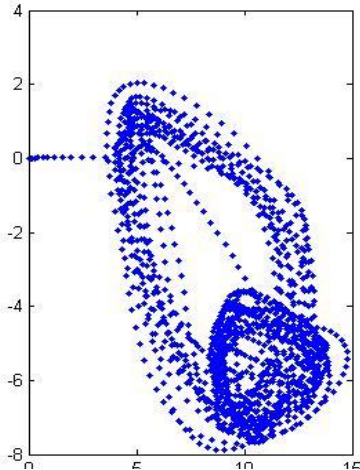
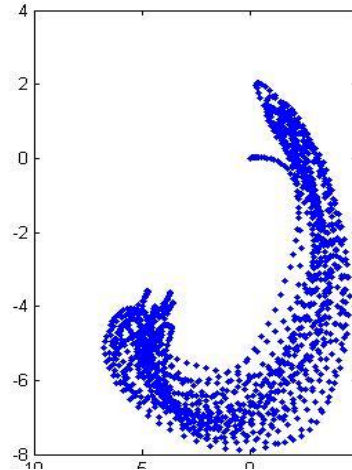
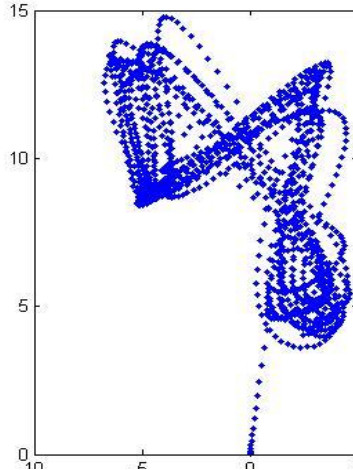


Gear 2 – roller skiis

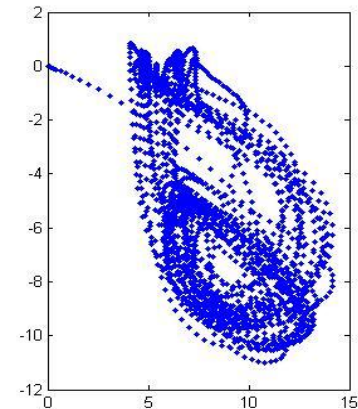
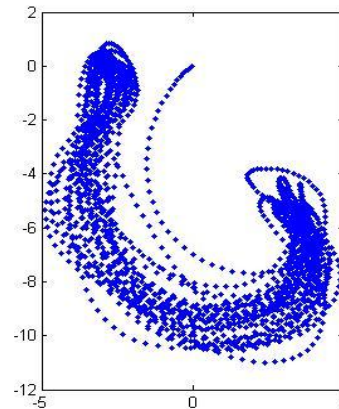
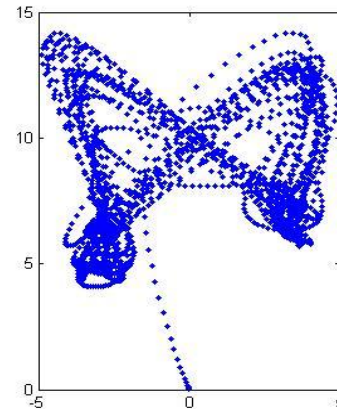
Anders



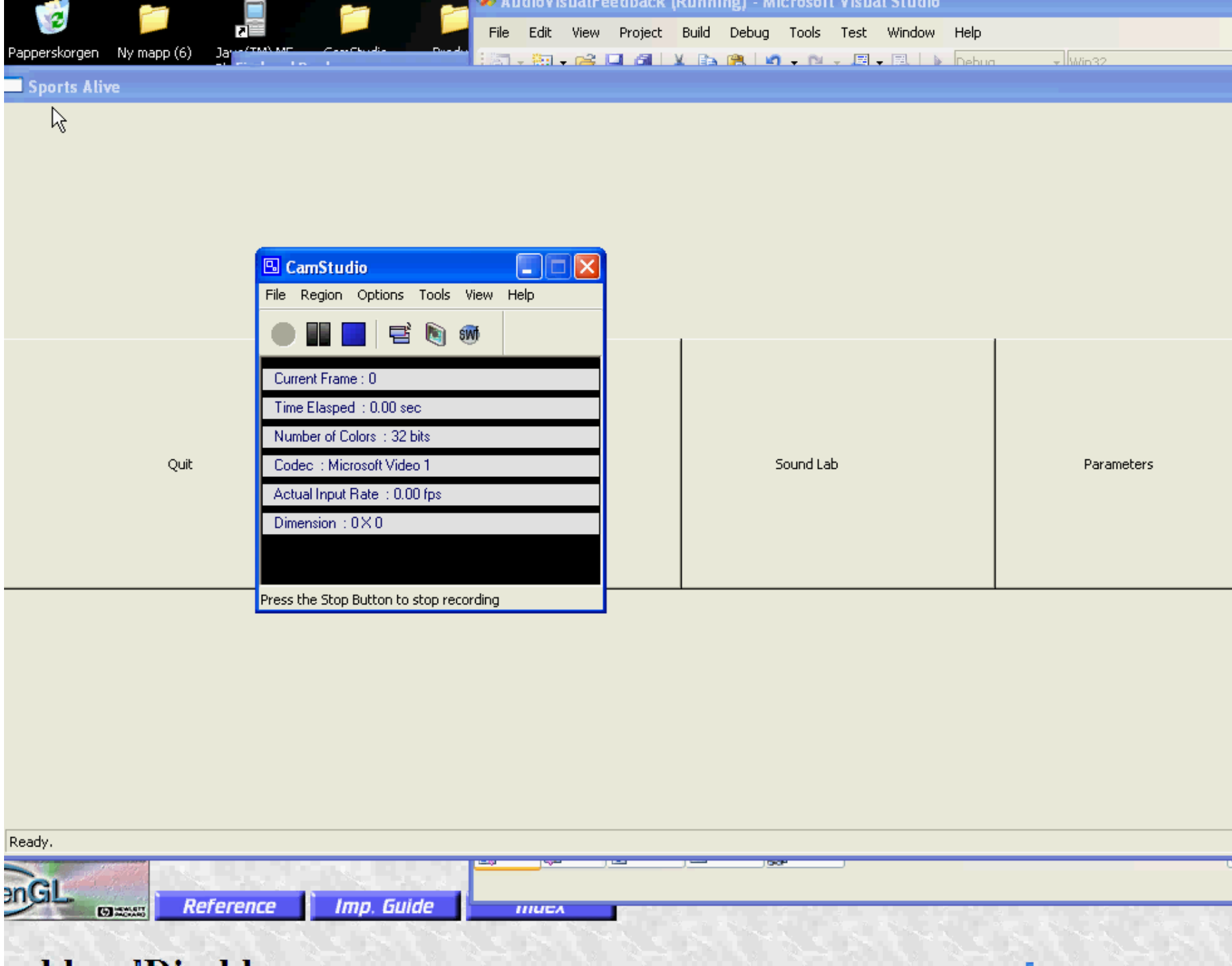
Markus



Hampus

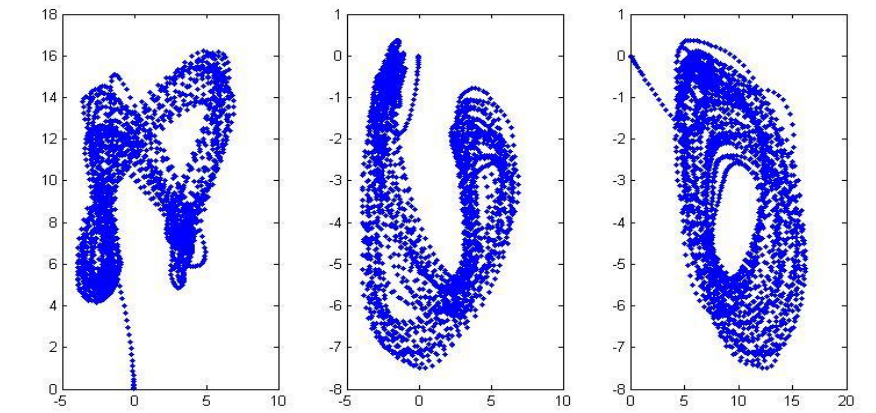


Model

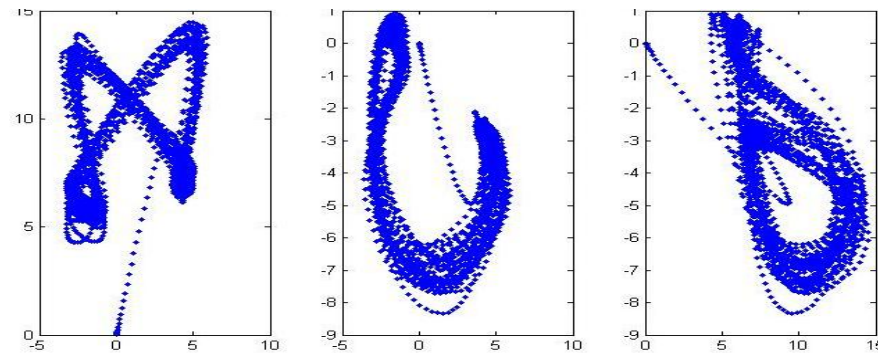


Gear 2 – snow

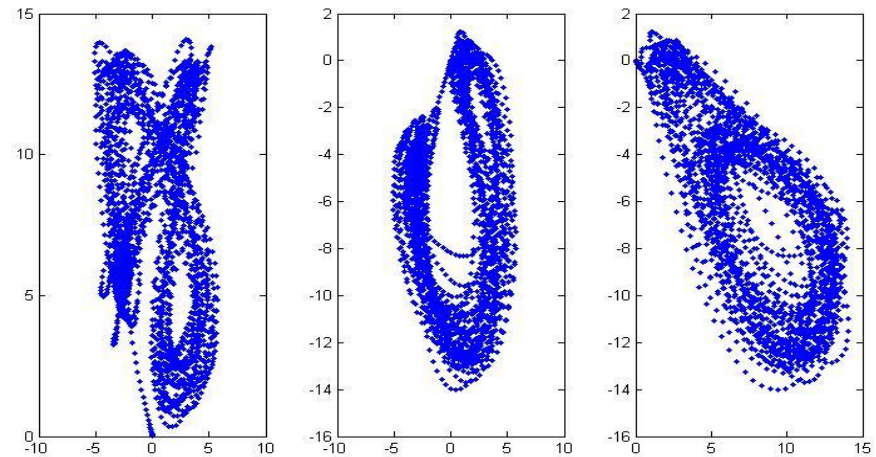
Jakob



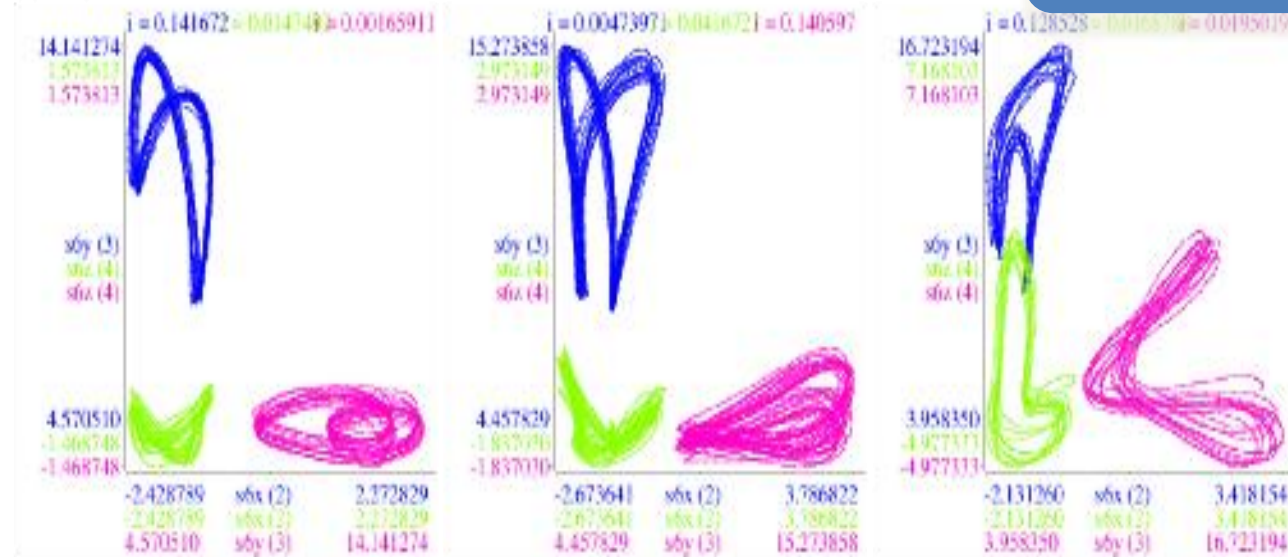
Stian



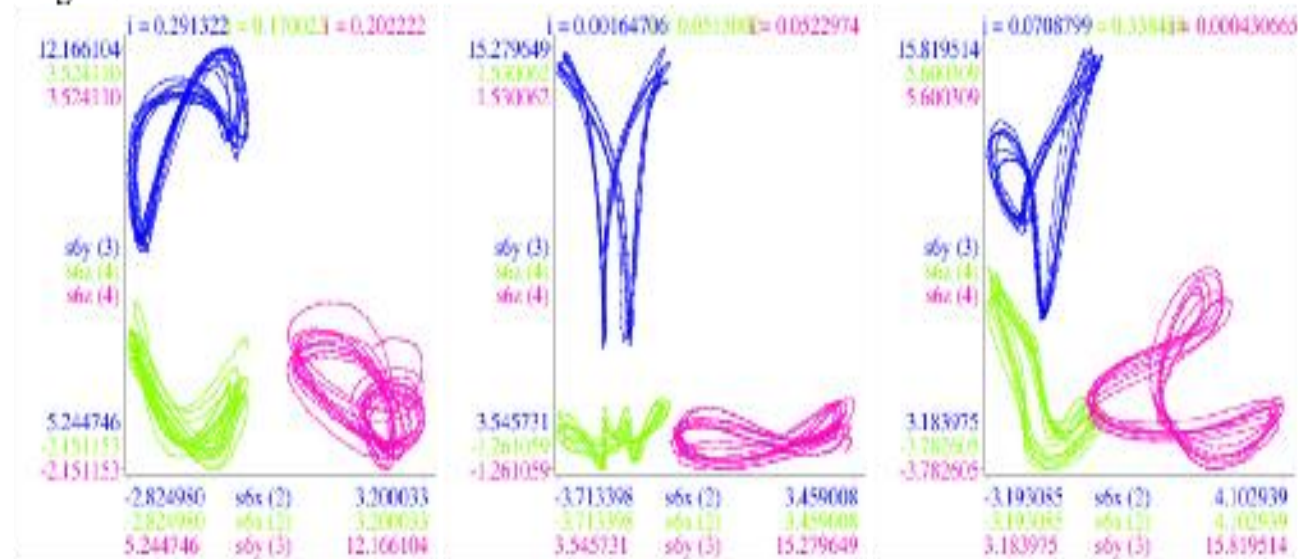
Jesper



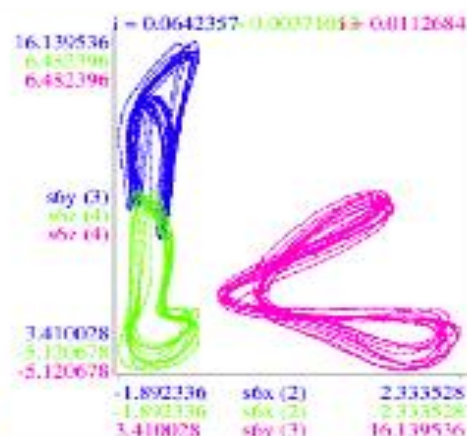
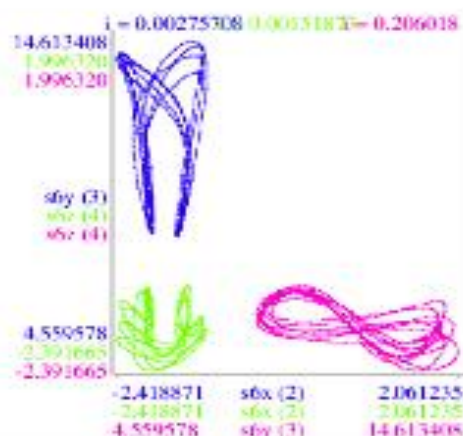
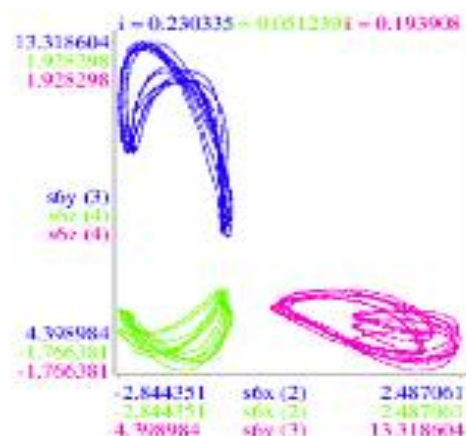
Jennie



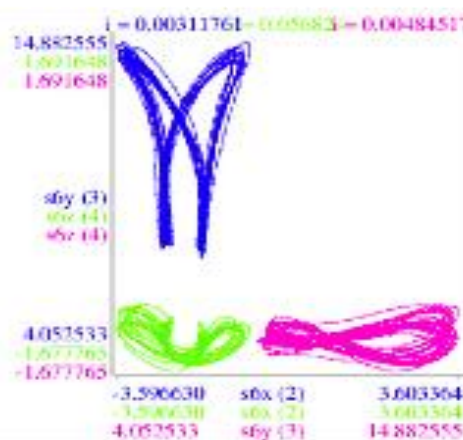
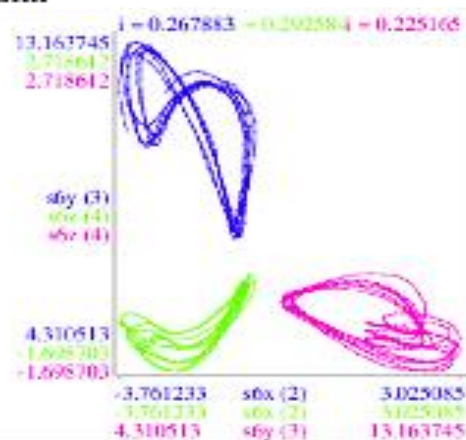
Magdalena



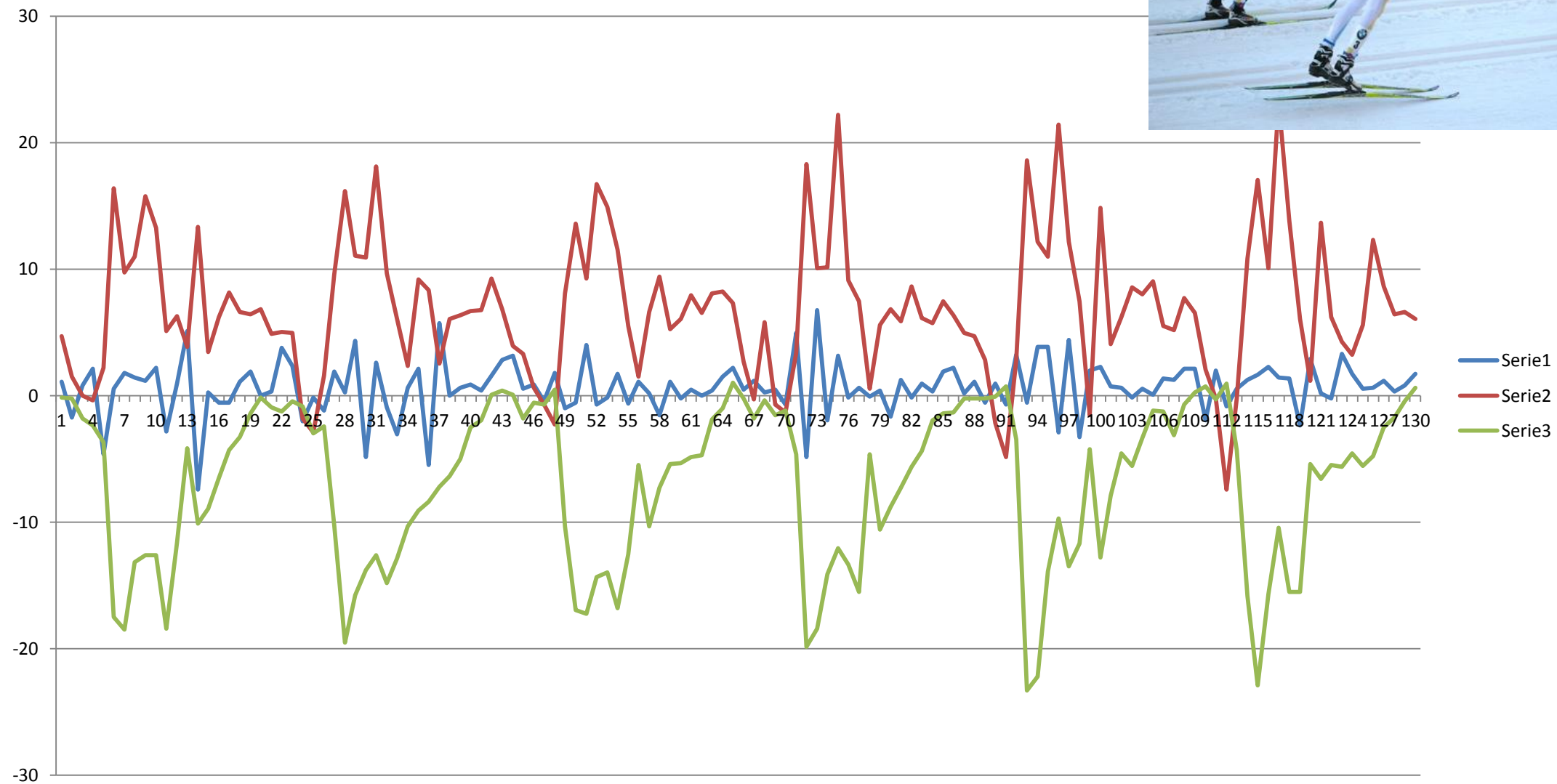
Simon



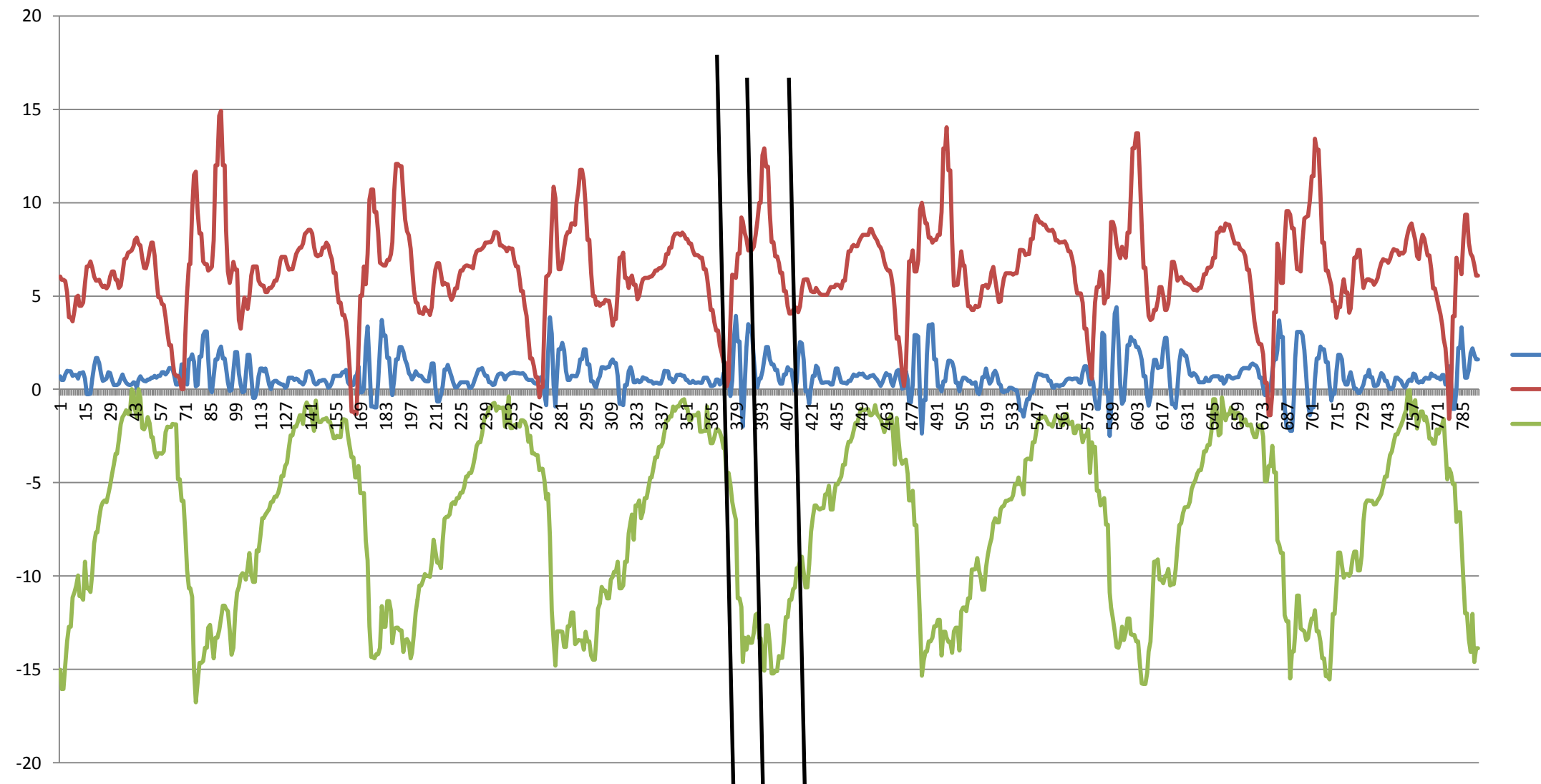
Elin



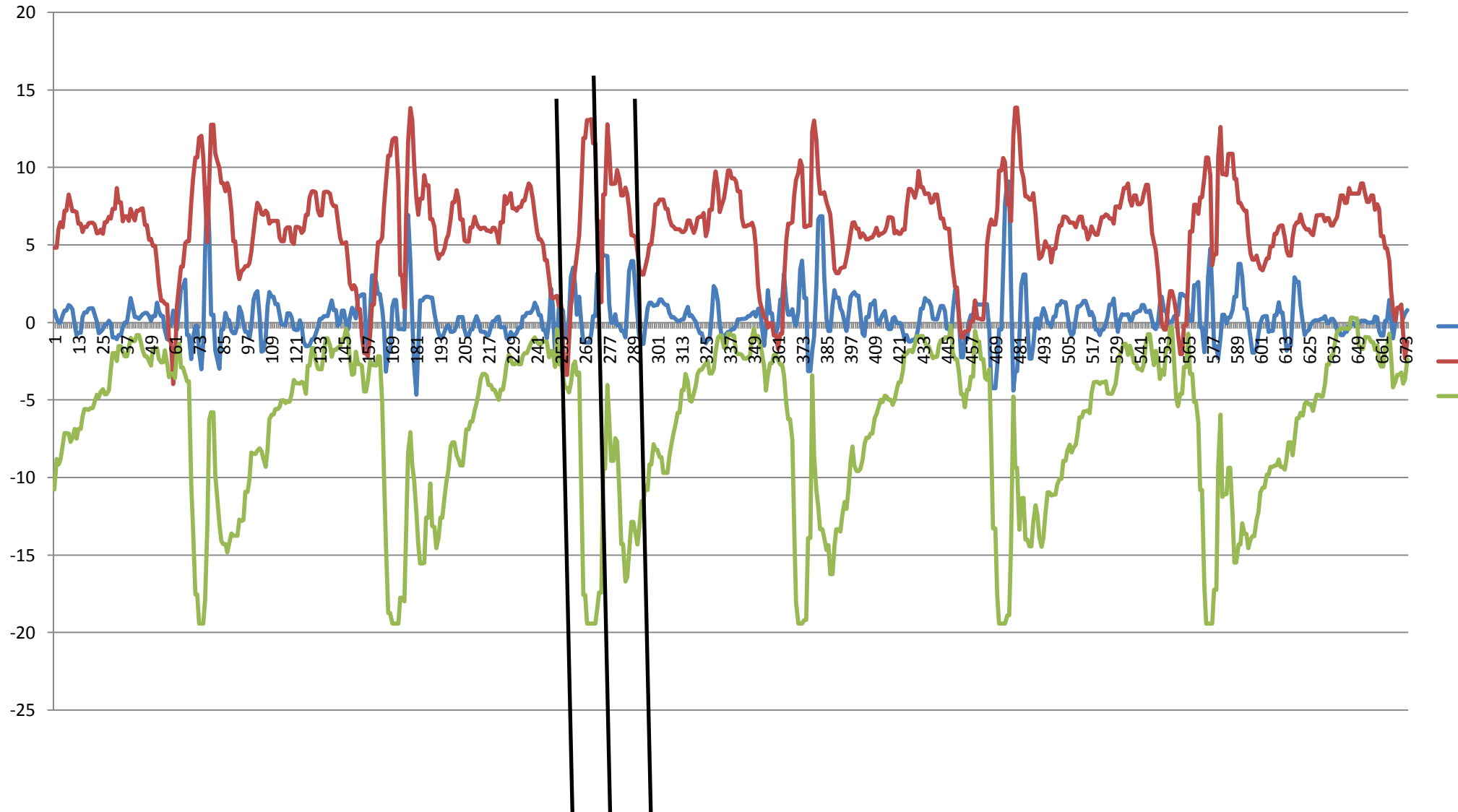
Double poling



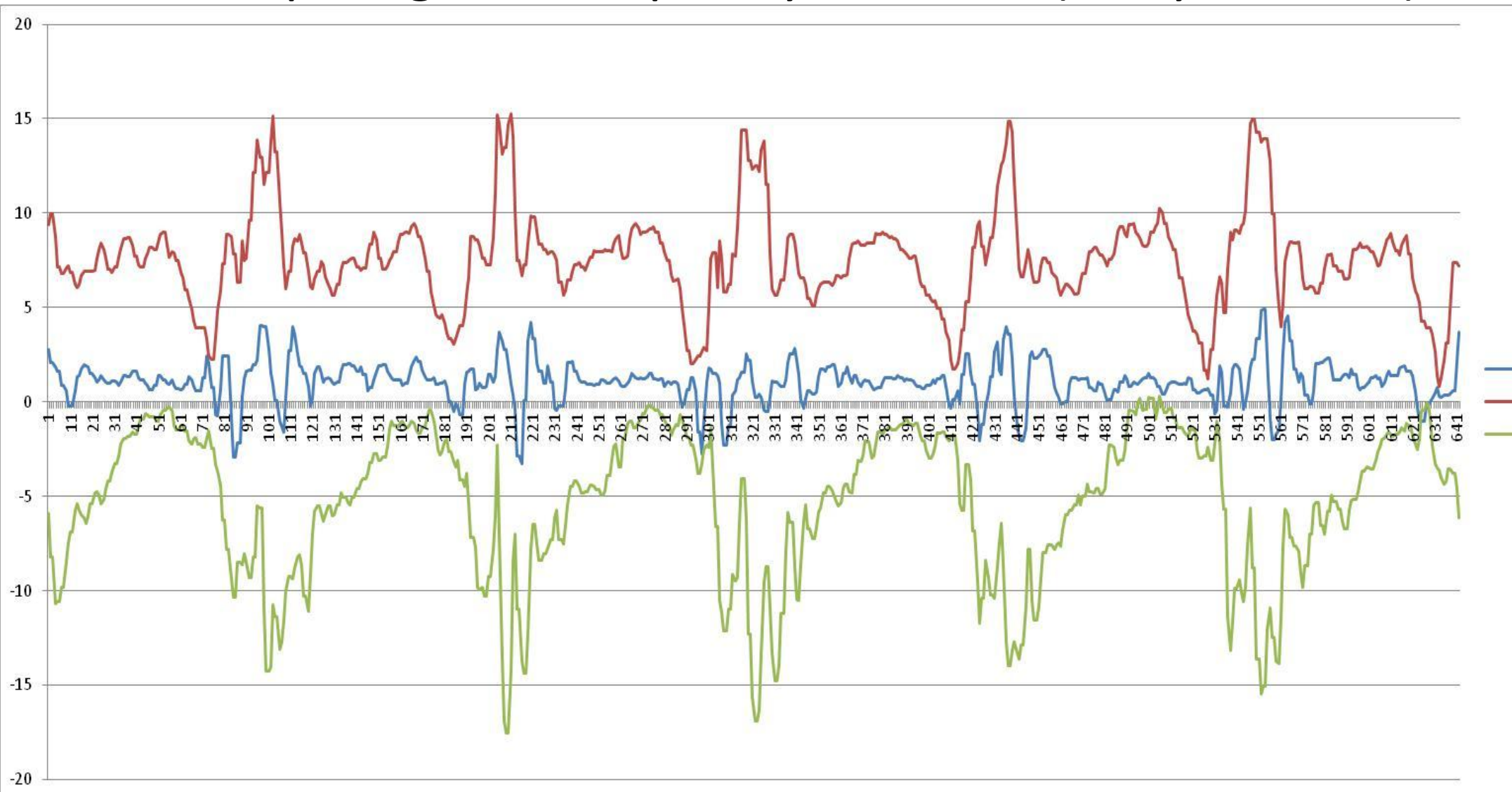
Double poling (världselit)



Double poling – junior



Double poling Low frequency exerciser (45 cycles/min)



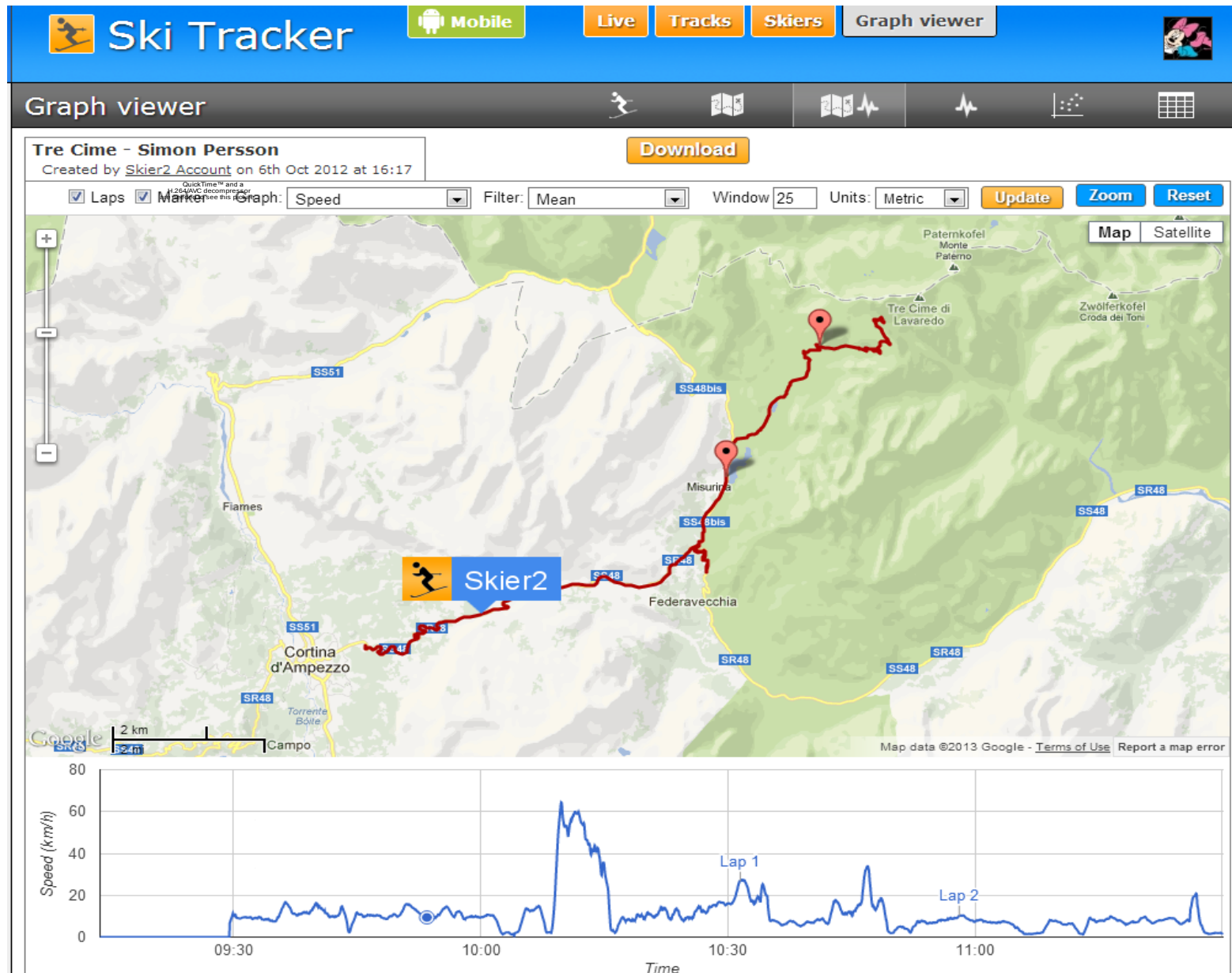
XC-trainer – an intelligent training tool

- First version
 - Logger – intelligent training log
 - Tool for development of strategic skiing skills
 - Operator station for trainers
 - Some KPIs
 - Symmetry
 - Variability
 - Energy

Based on a novel data analysis technique!



Strategic tools





Graph viewer



Tre Cime - Simon Persson

Created by [Skier2 Account](#) on 6th Oct 2012 at 16:17[Download](#)

Lap 1

	Gear 2						Gear 3			Gear 4					
	Left			Right						Left			Right		
Cycles	834			528			208			233			344		
Duration (s)	1,250.2			803.8			519.4			506.4			750.3		
Amplitude	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
	2.00	2.68	2.97	2.10	2.57	2.83	1.14	2.86	4.37	1.25	2.54	3.39	1.32	2.64	3.88
Consistency	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
	-	2.01	3.54	-	1.78	3.52	0.13	1.33	2.65	0.18	0.79	1.95	0.17	0.79	3.12
Symmetry	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
	1.16	2.08	4.91	0.98	2.26	3.10	0.41	3.72	6.12	0.24	2.75	5.31	0.30	2.40	5.61

Lap 2

	Gear 2						Gear 3			Gear 4					
	Left			Right						Left			Right		
Cycles	292			229			32			45			132		
Duration (s)	432.2			352.7			91.4			90.7			250.7		
Amplitude	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
	2.38	2.85	3.19	2.33	2.78	3.15	1.55	3.02	3.82	1.15	2.48	3.42	0.93	2.96	3.82
Consistency	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
	0.33	1.62	2.88	0.39	1.30	3.13	0.16	0.61	1.88	0.19	0.72	2.20	0.23	1.08	3.65
Symmetry	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
	1.58	2.31	3.19	1.11	2.63	4.29	0.84	2.20	5.06	0.49	1.49	3.31	0.58	1.23	4.62

Tool

Real-time

Off-line

Professionals

Research!

NOW!

Trainers

Research!

Soon!

Amateurs

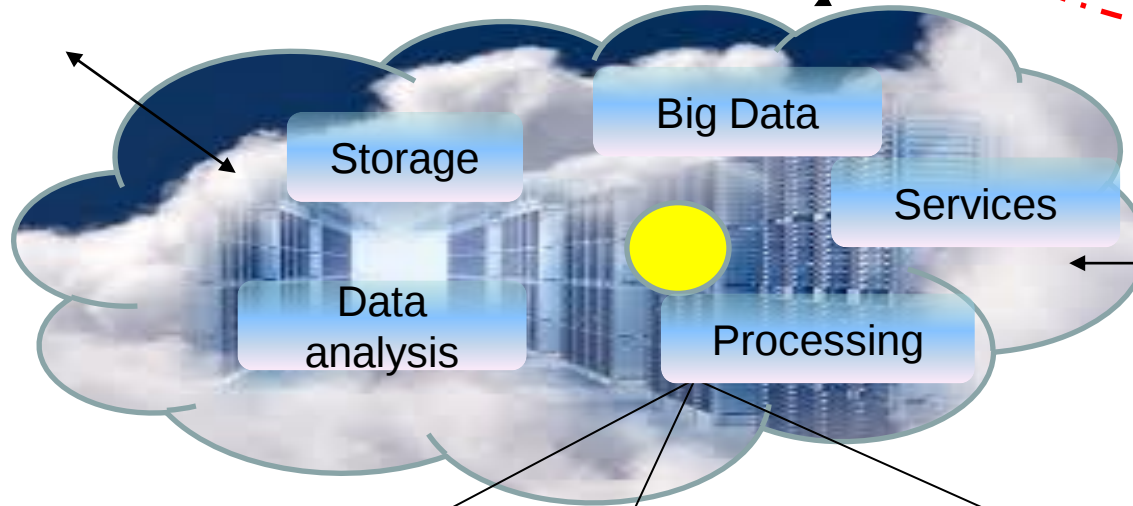
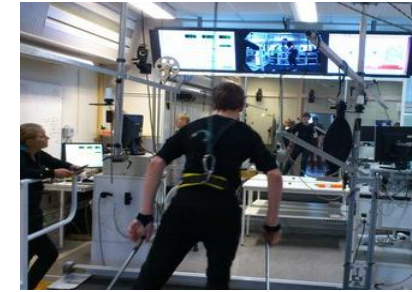
Research!

Testing!

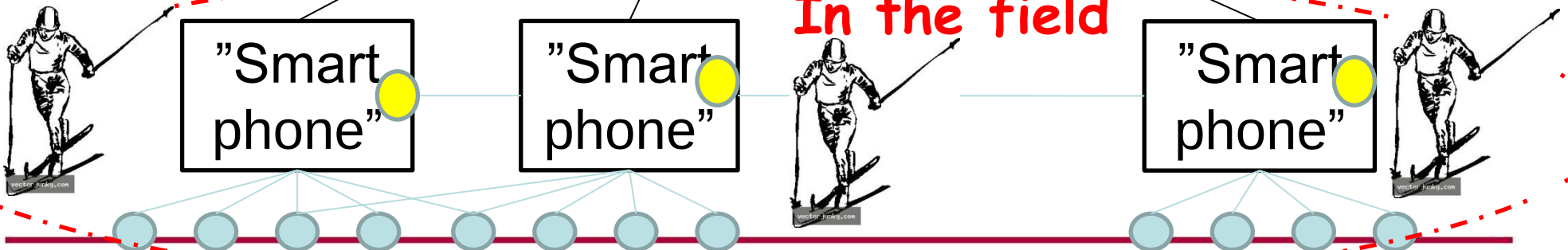
Context



In the lab



In the field



SICS

Similar Applications

- E-health
 - Eg. home care
- Wellbeing
 - Eg. Tools for reflection of your own health
- Performance och learning
 - Eg. Violin player, Heart rate monitors



⇒ Same technical infrastructure but different market and regulations

Multidisciplinary team

- Skiing and physiology expertise
 - H-C Holmberg
- Users: Elite senior and junior skiers
 - Daniel Rikardsson, Thomas Stöggl, Markus Lejon, Jesper Norström
- Mathematical modelling
 - Anders Holst
 - Arndt Jonasson
- Bio mechanics
 - Martin Eriksson
 - Thomas Stöggl
- User interaction
 - Jakob Tholander
- Programming
 - Tom Homewood
 - Razee Jamal
- Project management, facilitator, integrator, coordinator,...
 - Christer Norström and Magnus Jonsson

Thanks!

This project is sponsored by Vinnova, Swedish Olympic Committee, Peak Innovation, Robotdalen, Nationellt Vintersportcentrum and SICS!

The project is part of Swedish Internet of Things initiative, the vision of an Internet which not only connects people but also things in a meaningful context for a good life!

Market

- Size of Sport industry in Sweden 2010 was around 65 Billion SEK
- Sport industry in US was ~425 Billion US\$
- Today
 - 5 Million people use apps for sport and health
- 2015
 - 500 Million are predicted to use apps for sport and health
- Fitness-related activities is the strongest growing trend

Hinders for Swedish Sport Industry

- We lack a developed eco system
- We lack a strong culture and experience of combining business and sport products
- We lack entrepreneurs with multidisciplinary competence
- We lack both soft funding and venture capital

The Swedish opportunity

- We have a profound sports culture
- A lot of commerciable sport prototypes and research
- We have the experience and knowledge to develop and produce products
- We are early adopters of technology
- Results from elite can be used for wellbeing and health (mass follow class)

We have it all, but the business => we need to develop an eco-system, create multidisciplinary teams and education

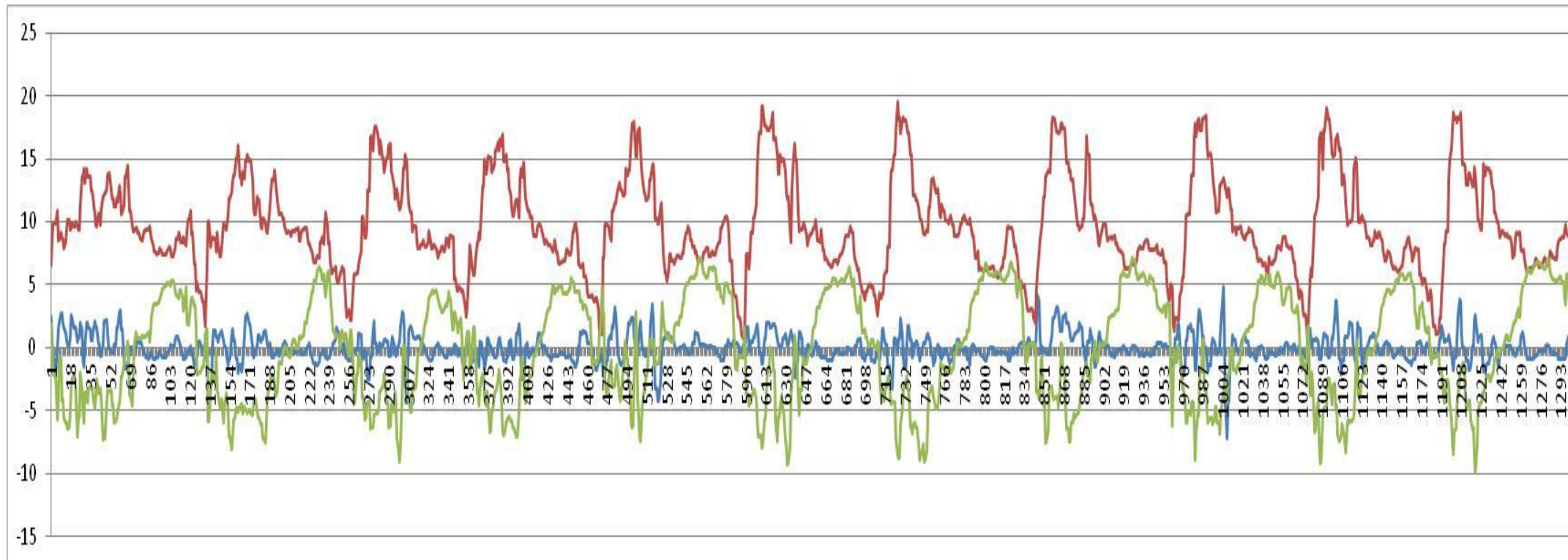


The Internet and Sport Wave

The difference between being
sucessful or not is **TO DO IT!!**

[RIDE THE WAVE AND BE A WINNER]

Magnus klassiska stil – cykel 1



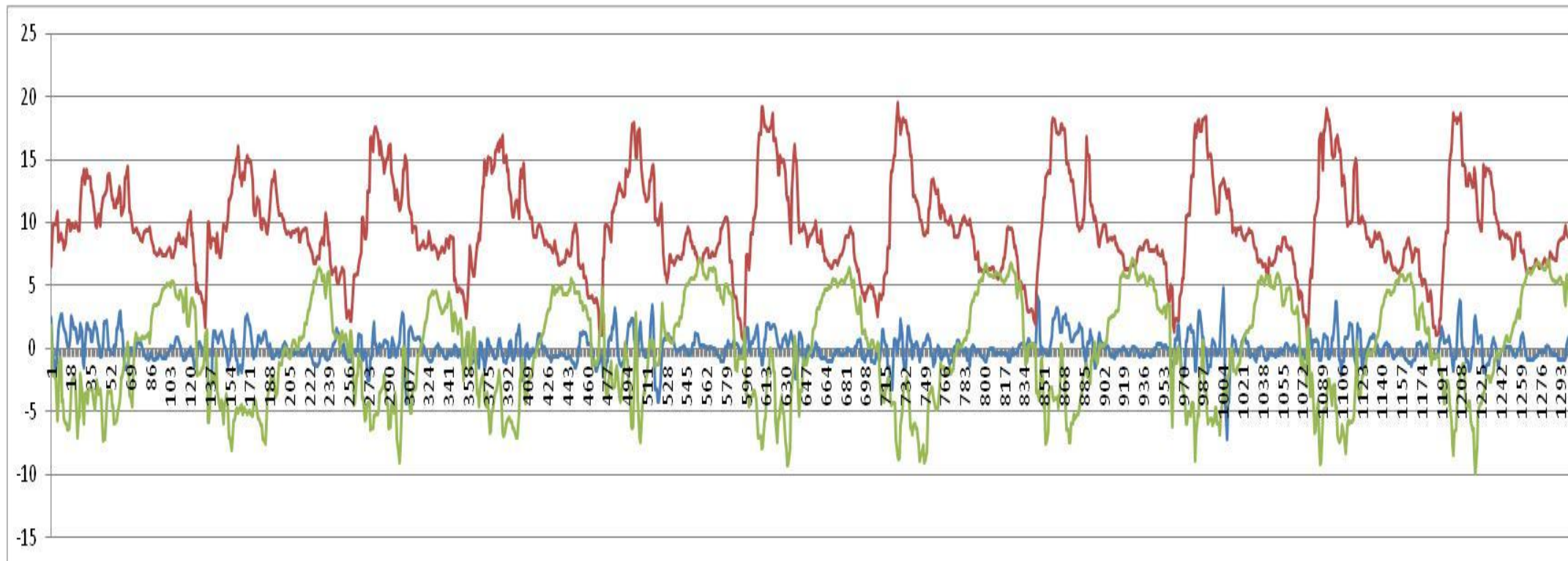
8000 - 9200

Brus = 1,2

Frekvens = 41,4 tag/min

Tyngdpunkt= 57,2%

Magnus modern– cykel 3



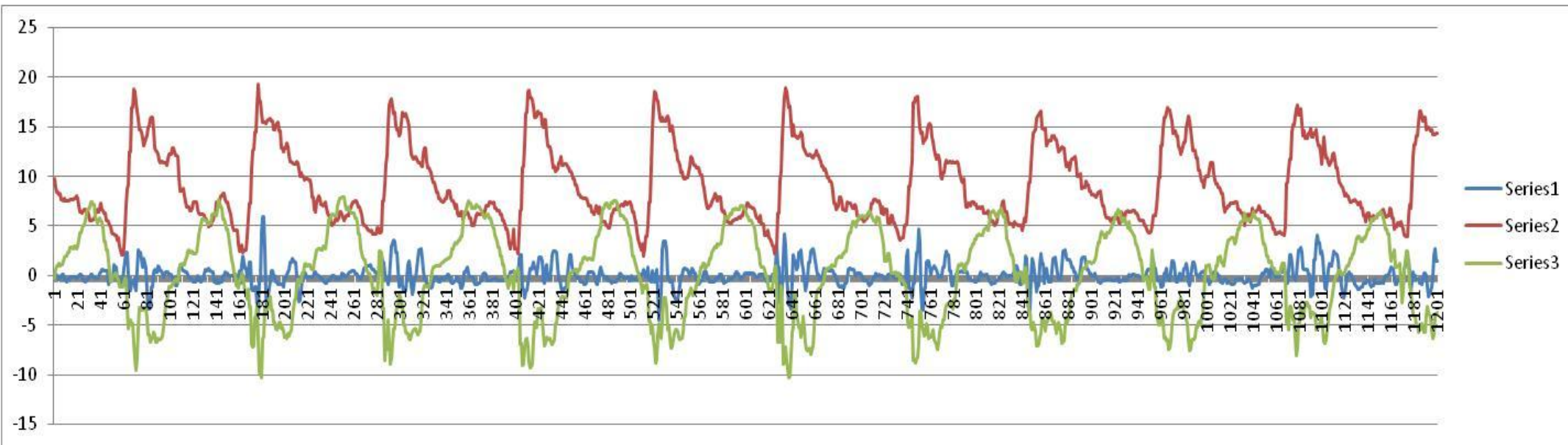
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Brus = 1,1

Frekvens = 41,4 tag/min

Tyngdpunkt= 46,3%

Jesper- uppför



MJ-JN-2012-09-08_08-47-39.csv

51700- 52900

Brus = 1,53

Frekvens = 42,3 tag/min

Tyngdpunkt= 50 %