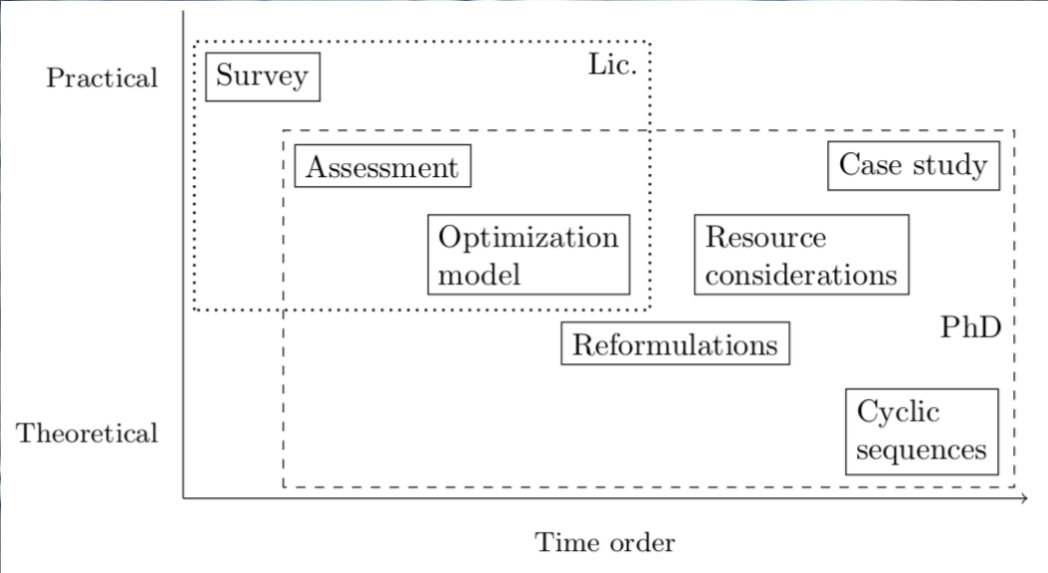


Samplanering av servicefönster och tågtrafik - forskningsresultat, fallstudie och fortsättning

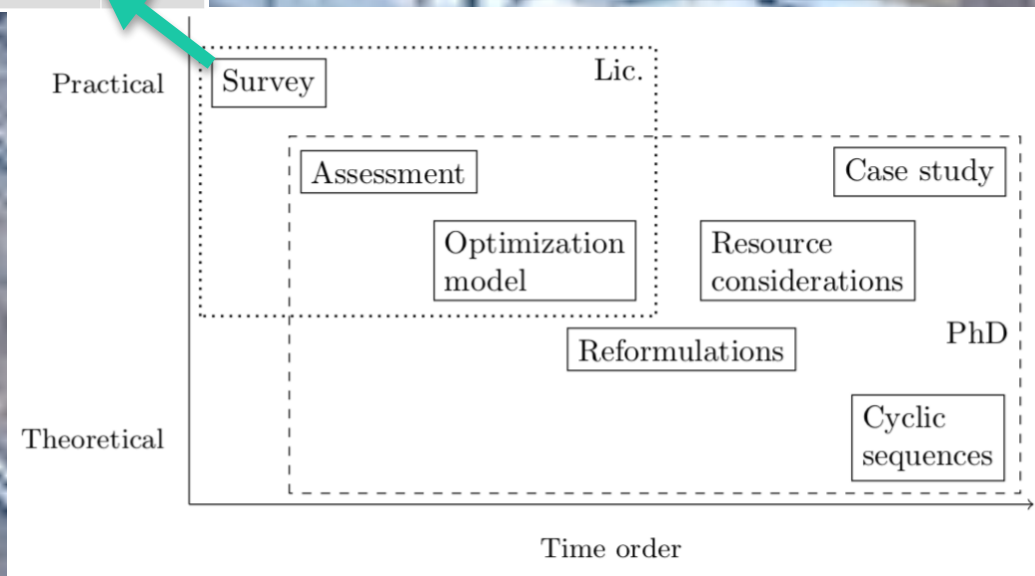
KAJT höstseminarium 2018-11-22

Tomas Lidén





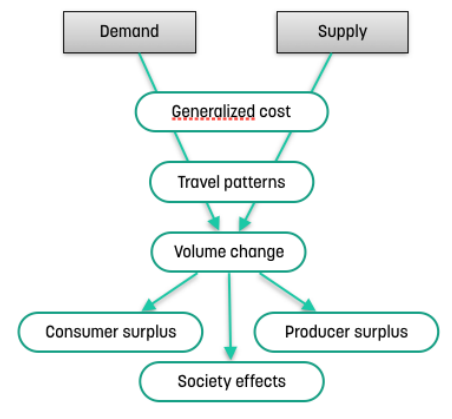
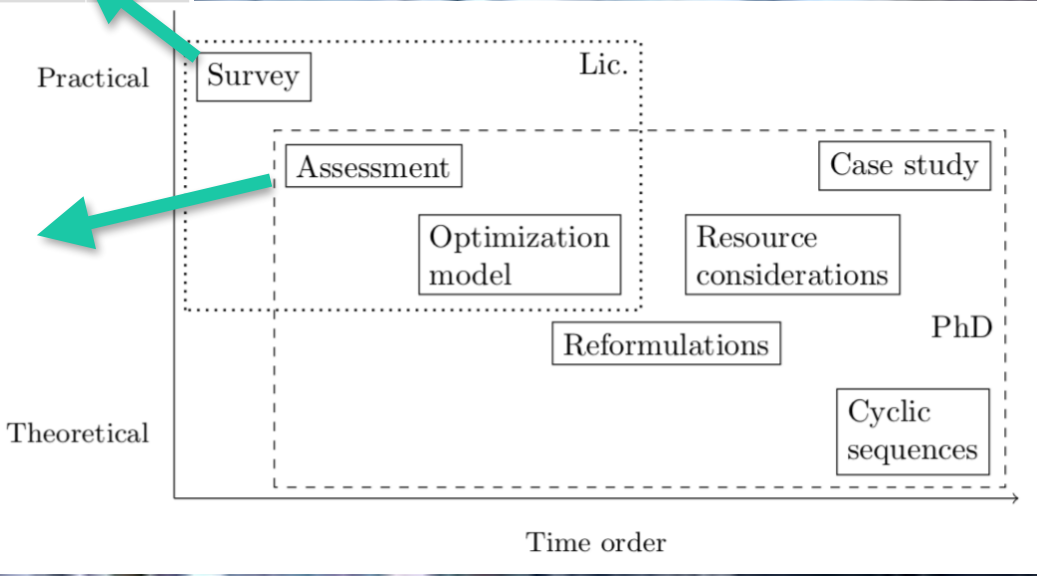
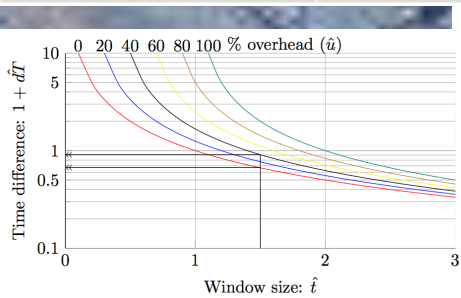
Problem	Lines of research	Publications
Maintenance dimensioning	Network design	3
	Service life & intervals	15
	Renewal scheduling	8
Contract design		
Resource dimensioning and localization		(1)
Possession scheduling	Possession scheduling	15
Vehicle routing & team scheduling	Deterioration-based sch.	12
	VR & Team scheduling	14
Rescheduling		
Project planning		(1)
Work timing & resource scheduling	Work timing & resource sch.	7
Track usage		



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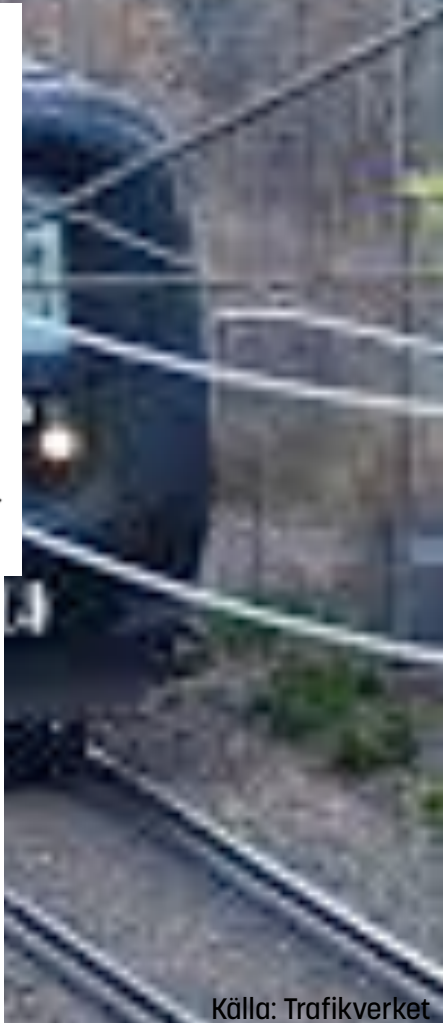
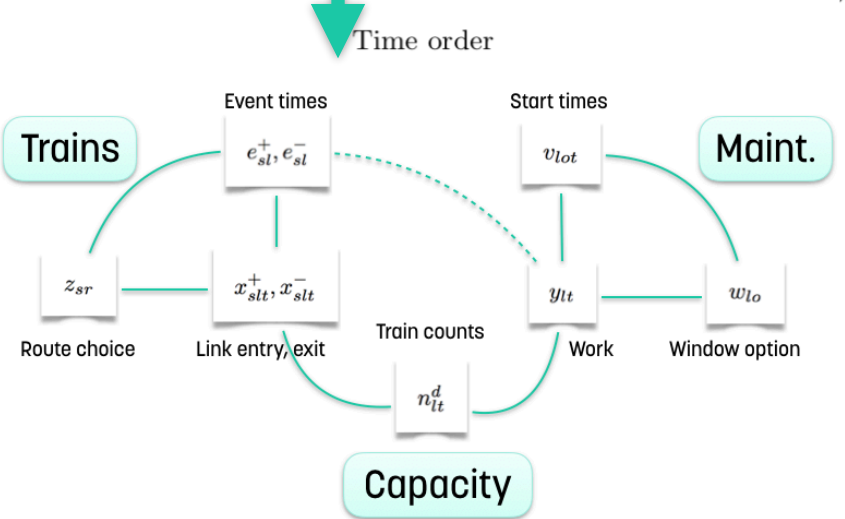
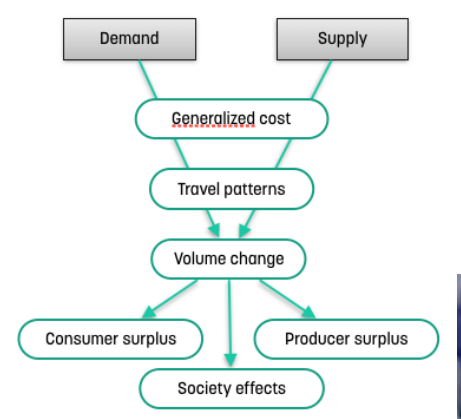
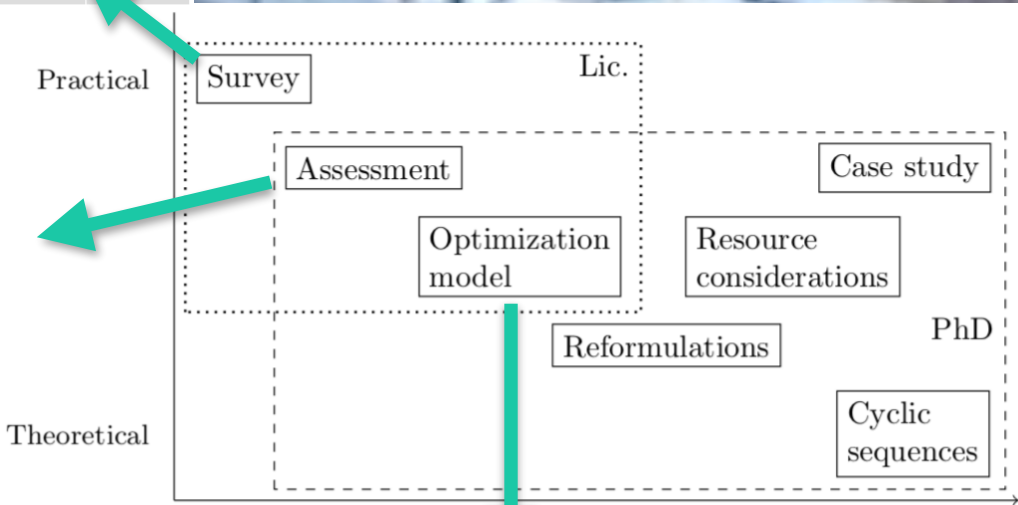
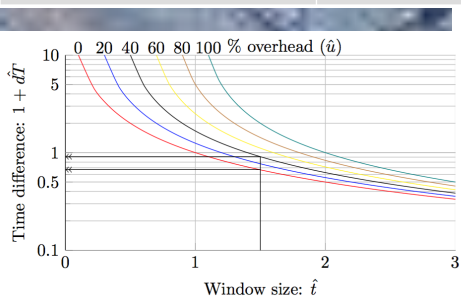
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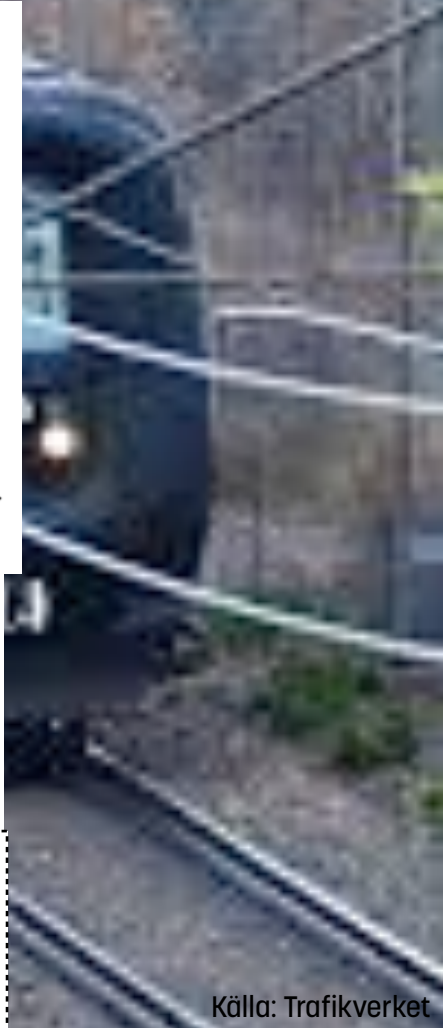
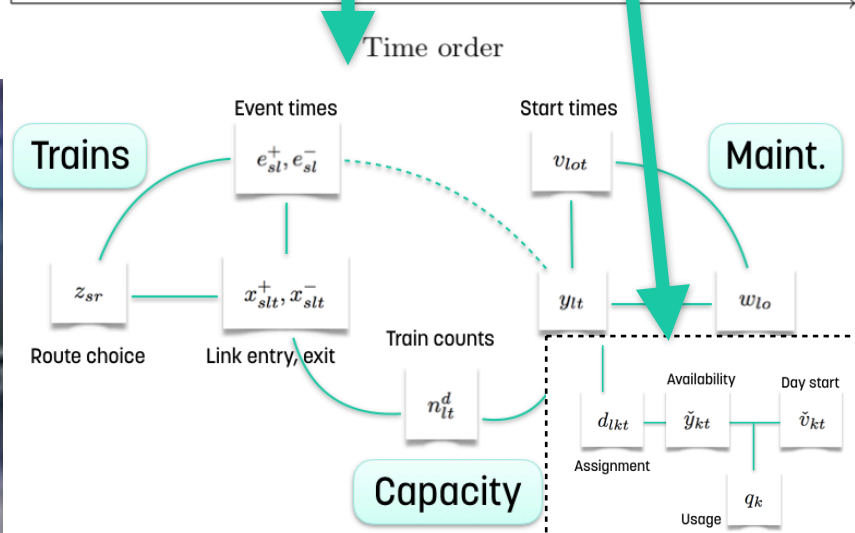
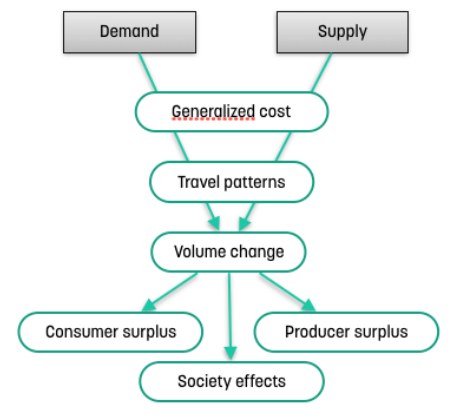
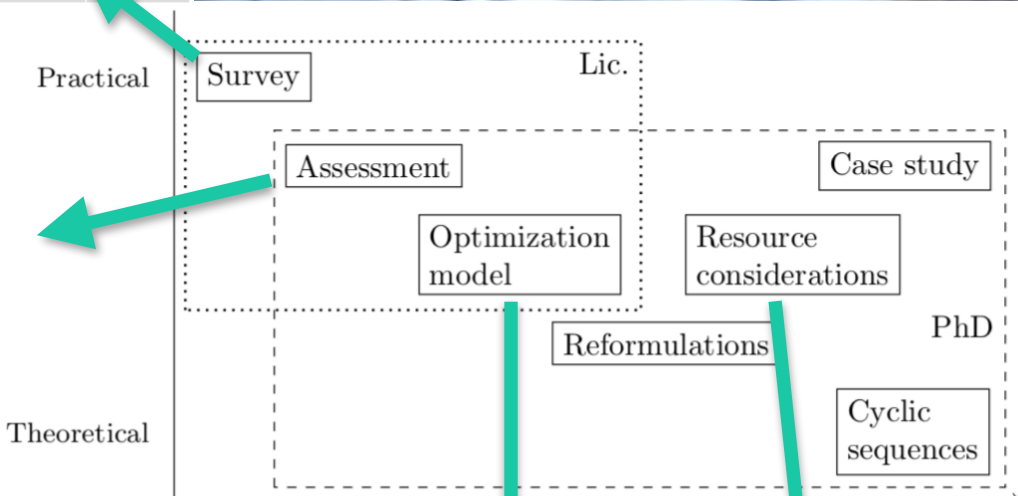
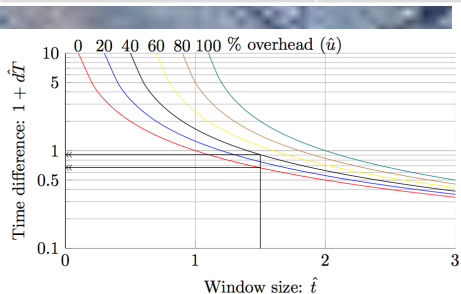
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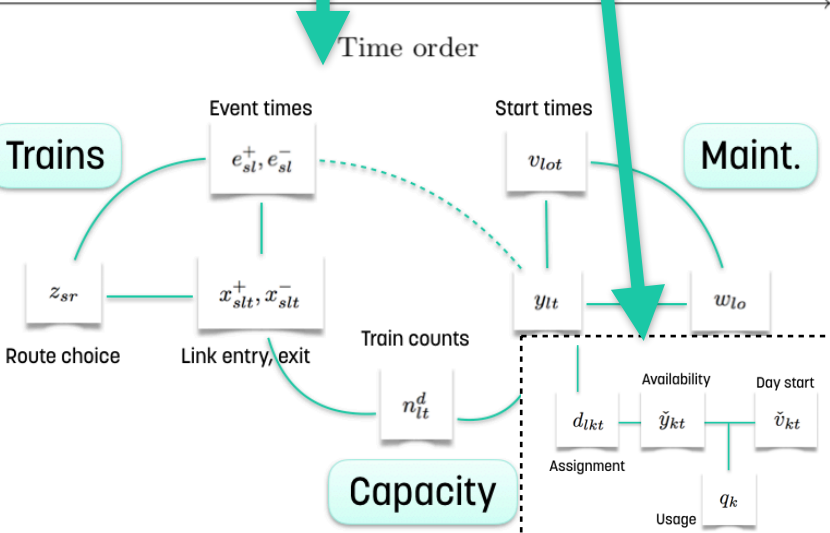
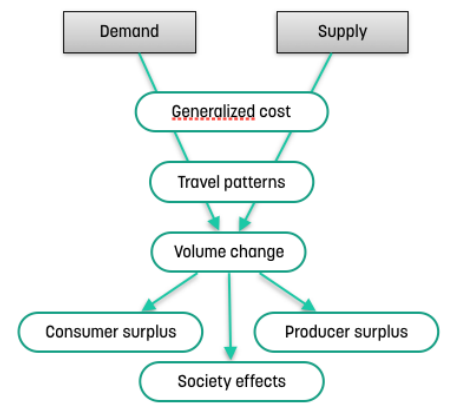
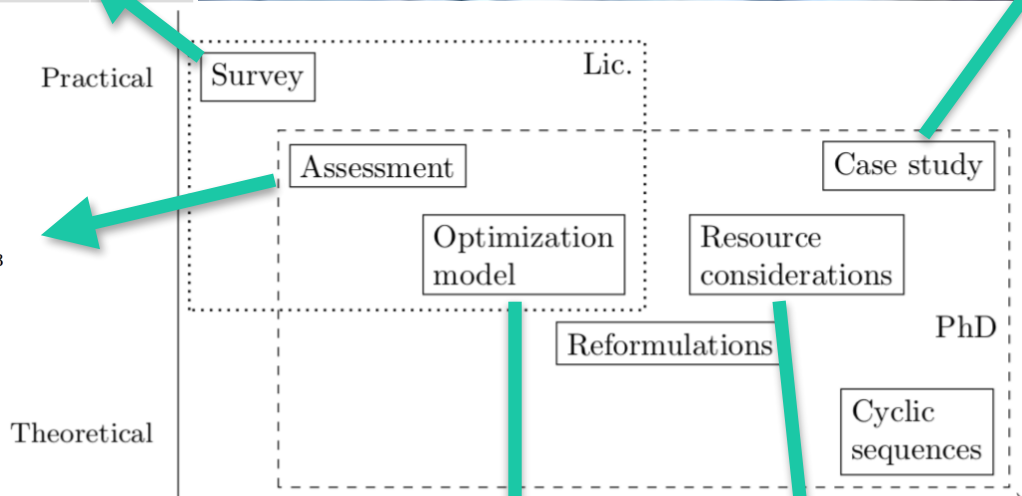
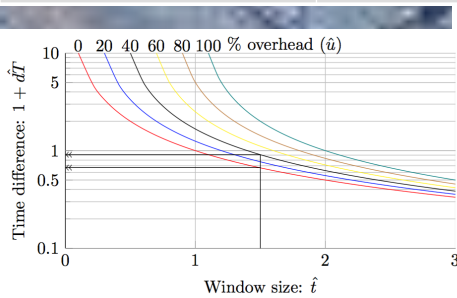
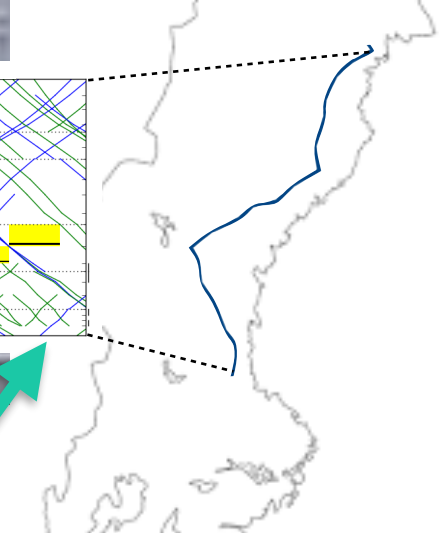
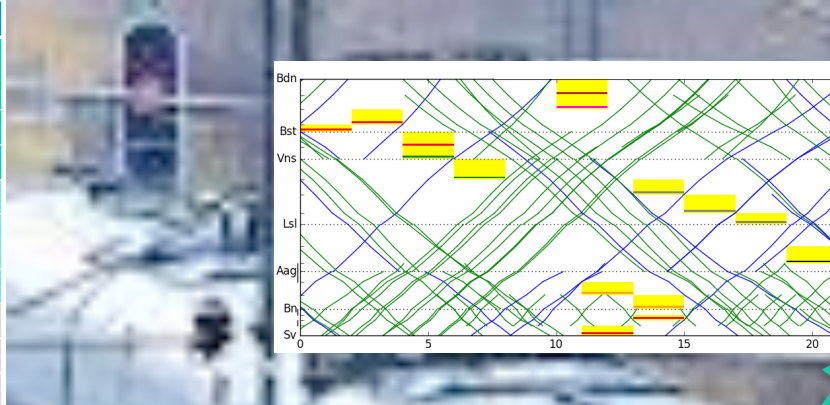
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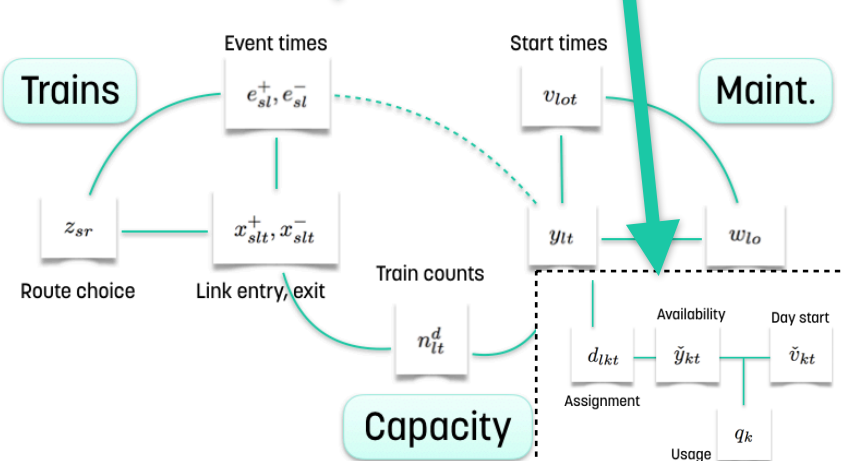
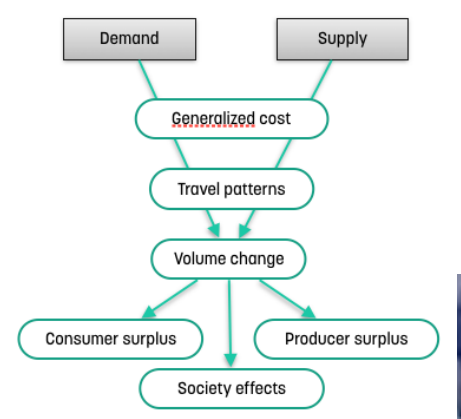
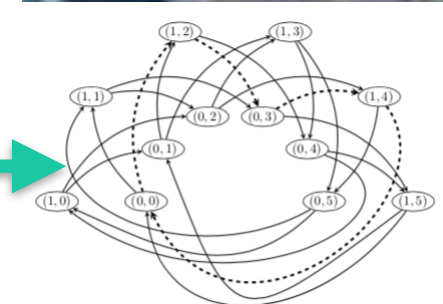
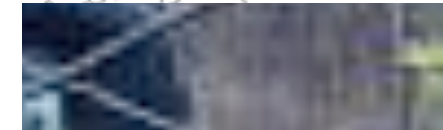
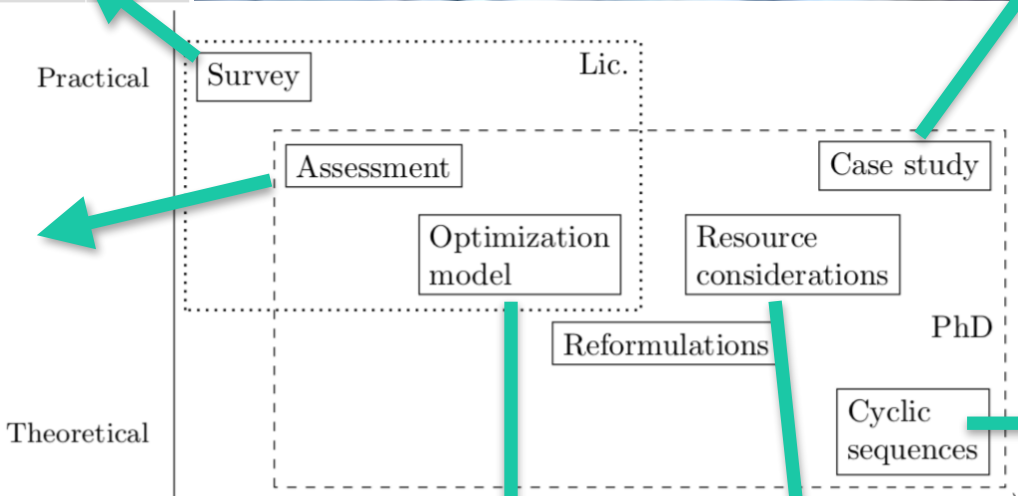
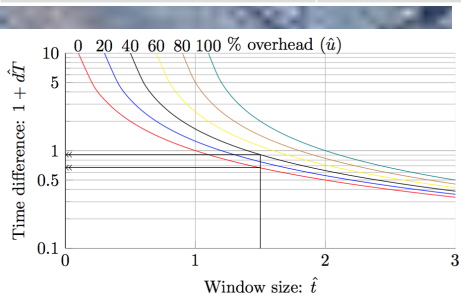
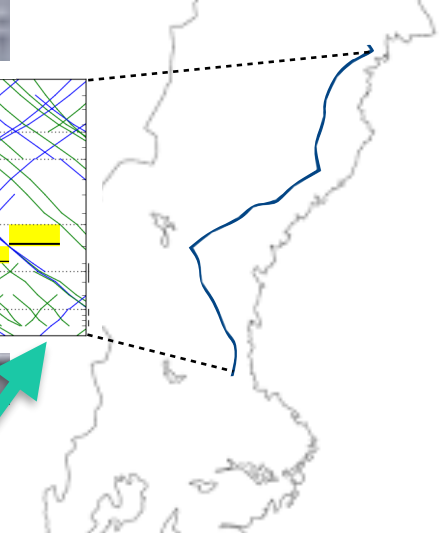
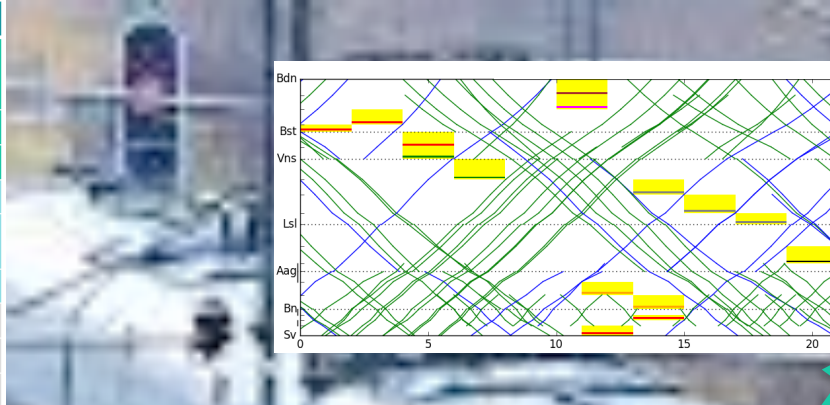
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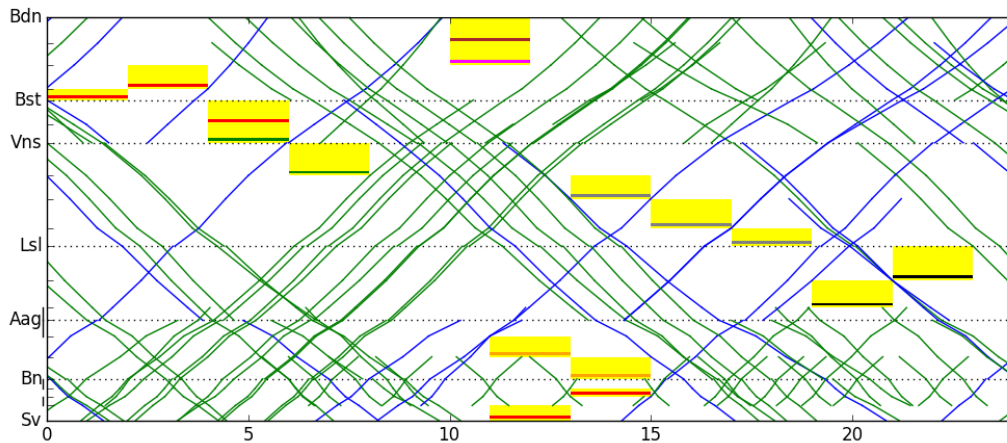


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Optimeringsmodell

Schemalägger tåg, fönster och UH-resurser



Hanterar

- Nätverk, vägval
- Gångtider, uppehåll
- Fönsteralternativ
- Kapacitetsutnyttjande
- Arbetstidsregler

Saknar

- Konfliktreglering
- Omlopp

Originalmodel - Lidén and Joborn (2016), TRC, doi: [10.1016/j.trc.2016.11.016](https://doi.org/10.1016/j.trc.2016.11.016)

Resurser - Lidén et al (2018), JRTPM, doi: [10.1016/j.jrtpm.2018.02.001](https://doi.org/10.1016/j.jrtpm.2018.02.001)

Norrandstrafiken

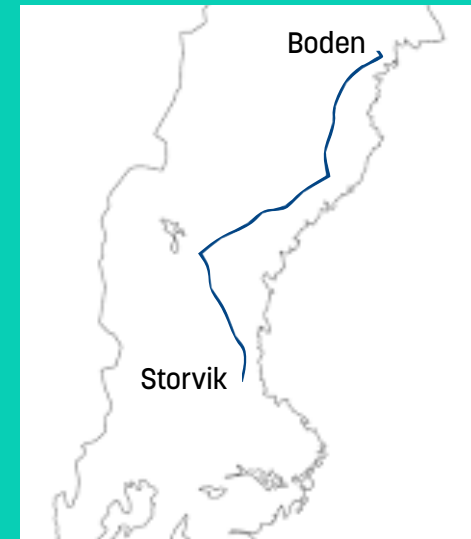
20 länkar, enkelspår

82 tåg, daglig cyklisk plan

Utan/med UH-resurser

Validering, kostnadskänslighet, etc

Samplanering vs sekventiell planering



Resultat

Allmänt

- Rimliga och användbara resultat
- Översiktsplan, ej konfliktfri tidtabell

Norrlandstrafiken

- Korta fönster (2h) går bra
Liten ökning av tågkörningskostnad (0.5%)
- Långa fönster (3-4h) varje dag är svårt
- Stabila resultat (> 30% kostnadsändring krävs)
- Resurssnåla fönster bättre
- Samplanering sparar 11-17% för underhållet

Slutsatser

- Optimering fungerar
- Marginalkostnader är viktiga

Samplanera drift och underhåll!

- Stor besparingspotential (> 225 MSEK)

Fortsättningsprojekt

Andra trafik- och anläggningsfall

- Dubbel-/flerspår, persontrafik
- Involvera TrV m fl

Modellförbättringar

Prova lösningarna?

2019-2020

Projekt: "Effektiv planering av järnvägsunderhåll - servicefönster"

Finansierat av Trafikverket, via KAJT

Disputation måndag 2018-12-10, Norrköping

Avhandling doi: [10.3384/diss.diva-152491](https://doi.org/10.3384/diss.diva-152491)

Tack!

www.liu.se