

Automatic container model crane

Juni 17, 2016

Gruppe 633

Daniel Bähner Andersen

Nicolaj Vinkel Christensen

Ralf Victor Lømand Ravgård Christiansen

Simon Bjerre Krogh

Thomas Holm Pilgaard

Institut for elektroniske systemer

Aalborg Universitet

Danmark



AALBORG UNIVERSITY
DENMARK



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► Minimally invasive surgery



Da Vinci surgical robot

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- ▶ Minimally invasive surgery
- ▶ Telemanipulation



Da Vinci surgical robot

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- ▶ Minimally invasive surgery
- ▶ Telemanipulation
- ▶ Only visual feedback



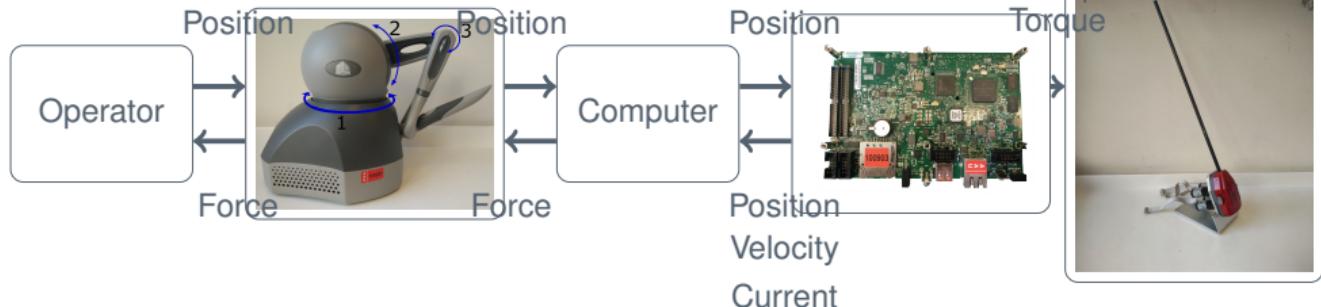
Improvement by haptic feedback

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- ▶ Haptic feedback can reduce the number of surgical errors



Control Architecture

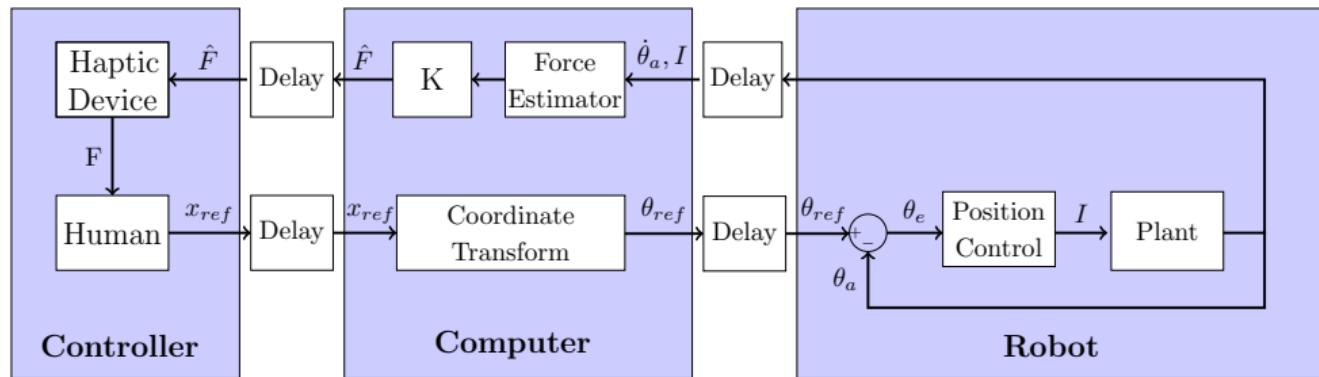
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- ▶ Two closed loops send reference signals mutually



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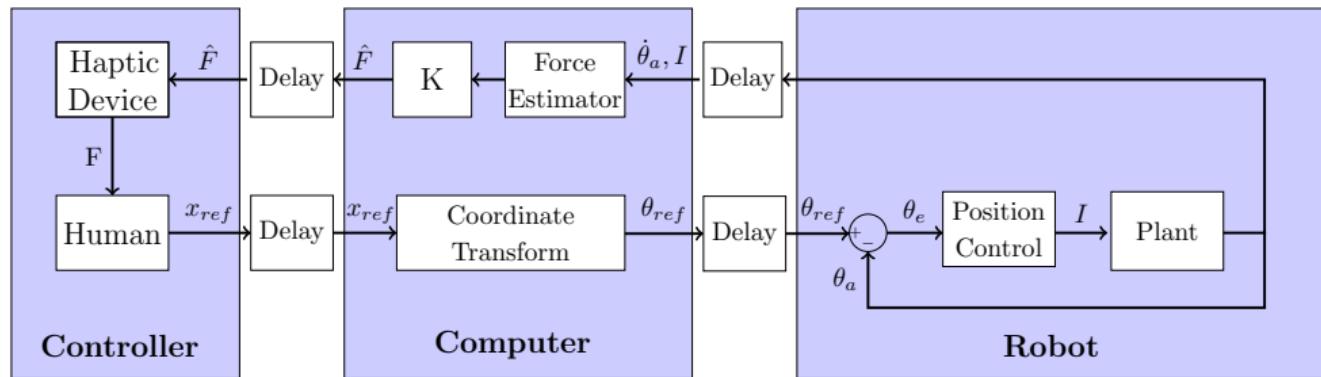
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- ▶ Two closed loops send reference signals mutually
- ▶ The architecture contains delays



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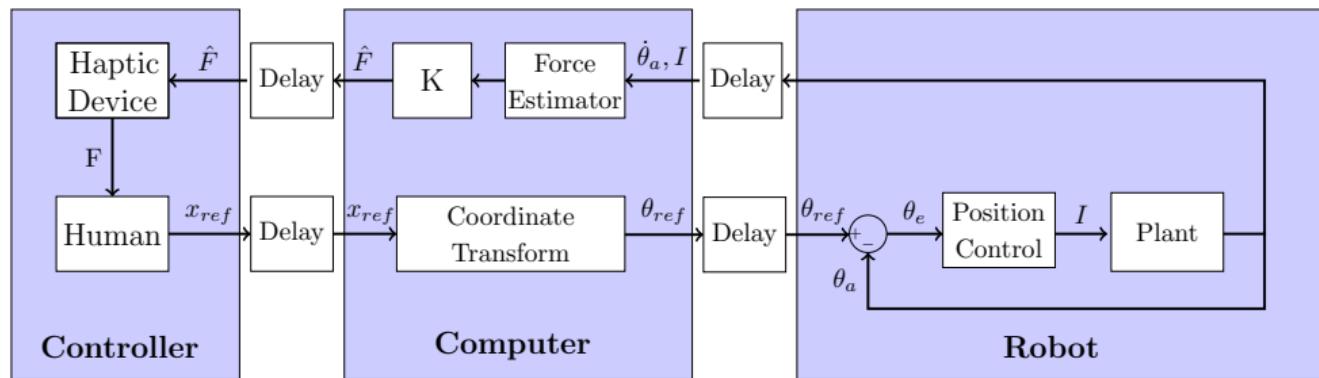
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- ▶ Two closed loops send reference signals mutually
- ▶ The architecture contains delays
- ▶ The force is estimated from the measured current





Simon Bjerre Krogh

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► Trolley

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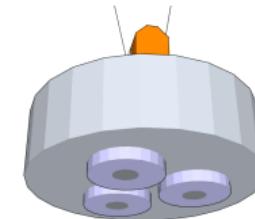
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► Trolley

► Elektromagnet



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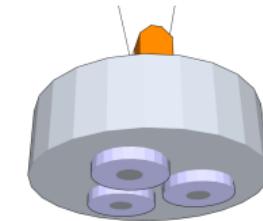
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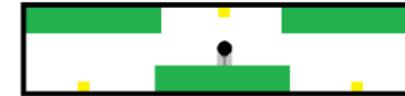
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- ▶ Trolley



- ▶ Elektromagnet



- ▶ Vinkel sensor

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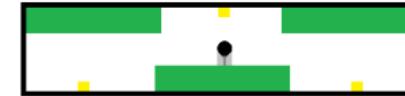
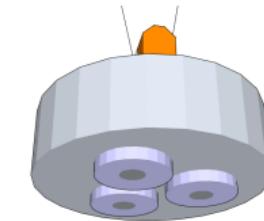
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- ▶ Trolley
- ▶ Elektromagnet
- ▶ Vinkel sensor
- ▶ Approximation af container vægt



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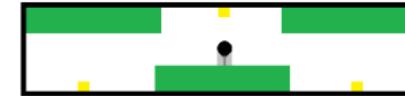
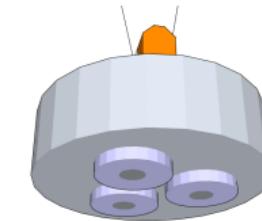
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- ▶ Trolley
- ▶ Elektromagnet
- ▶ Vinkel sensor
- ▶ Approximation af container vægt
- ▶ Statisk friktion



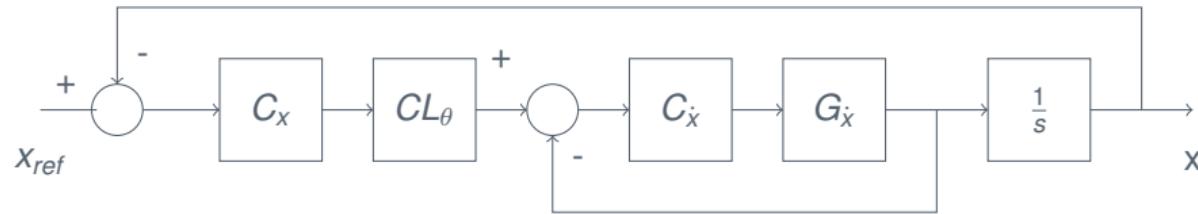
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► Statisk friktion



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► Analyse af kran

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- ▶ Analyse af kran
- ▶ Modeller er blevet udledt på baggrund af analyse

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- ▶ Analyse af kran
- ▶ Modeller er blevet udledt på baggrund af analyse
- ▶ Parameter estimeringer

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- ▶ Analyse af kran
- ▶ Modeller er blevet udledt på baggrund af analyse
- ▶ Parameter estimeringer
- ▶ Root locus er benyttet under udvikling af regulatorer

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- ▶ Analyse af kran
- ▶ Modeller er blevet udledt på baggrund af analyse
- ▶ Parameter estimeringer
- ▶ Root locus er benyttet under udvikling af regulatorer
- ▶ Strøm offset kan kompensere for statisk friktion

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- ▶ Analyse af kran
- ▶ Modeller er blevet udledt på baggrund af analyse
- ▶ Parameter estimeringer
- ▶ Root locus er benyttet under udvikling af regulatorer
- ▶ Strøm offset kan kompensere for statisk friktion
- ▶ Kaskade kobling

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Demonstration

Simon

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► Kontrol lab

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