# Detection and Mitigation of Corrupted Information in Distributed Model Predictive Control Based on Resource Allocation

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https://git.io/JEFGW

#### Algorithm 1: Secure DMPC.

```
Detection Phase:
   h := 0
   repeat
        Coordinator sets random \theta_{i}^{(h+1)}
        Subsystems solve (??), and send \lambda_i^{\star}(\theta^{(h)})
        Coordinator estimates \widehat{P}_i(k)^{(h)} and \widehat{\mathbf{s}}_i(k)^{(h)}
        h := h + 1
   until ||n^h - n^{h-1}|| < \epsilon
   Coordinator computes d_i using (??)
Negotiation Phase:
   Coordinator initializes \theta^{(0)}
   p := 0
   repeat
        Subsystems solve (??), and send \lambda_i^{\star}(\theta^{(p)})
         Coordinator updates allocation (??) using adequate versions of \lambda_i for each
         agent: \lambda_i^*(\boldsymbol{\theta}^{(p)}), if d_i = 0 and \lambda_{irec}, if d_i = 1
       p := p + 1
   until \|\boldsymbol{\theta}^{(p)} - \boldsymbol{\theta}^{(p-1)}\| < \epsilon
```



## Algorithm 2: Quantity decomposition based DMPC.

```
Coordinator initializes \boldsymbol{\theta}^{(0)} p := 0 repeat Subsystems solve (\ref{eq:coordinator}), and send \boldsymbol{\lambda}_i^\star(\boldsymbol{\theta}^{(p)}) Coordinator updates allocations (\ref{eq:coordinator}) p := p + 1 until \|\boldsymbol{\theta}^{(p)} - \boldsymbol{\theta}^{(p-1)}\| \le \epsilon
```



## Outline

Motivation

The Basic Problem That We Studied Previous Work

2 Our Results/Contribution

Main Results Basic Ideas for Proofs/Implementation



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## Make Titles Informative. Use Uppercase Letters. Subtitles are optional.

- Use itemize a lot.
- Use very short sentences or short phrases.



#### You can create overlays. . .

- using the pause command:
  - First item.
  - Second item.
- using overlay specifications:
  - First item.
  - Second item
- using the general uncover command:
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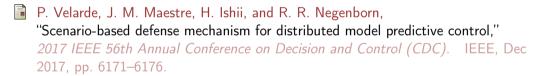
## Summary

- Resource allocation based DMPC is vulnerable to attacks.
- Sub-problems structure has time invariant parameters.
- Attack can be estimated using these parameters.
- Outlook
  - Inequality Constraints yield Hybrid behavior
  - Non-linear attack model



## For Further Reading I





S. Someone.
On this and that.

Journal of This and That, 2(1):50–100, 2000.



#### Questions?

 ${\it Repository} & {\it Contact} \\ {\it https://github.com/Accacio/SysTol-21} & {\it rafael-accacio.nogueira@centralesupelec.fr} \\$ 



