

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

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5th International Conference on Control and Fault-Tolerant Systems, 2021



<https://git.io/JEFGW>



Algorithm 1: Secure DMPC.

Detection Phase: $h := 0$ **repeat**Coordinator sets random $\theta_i^{(h+1)}$ Subsystems solve (??), and send $\lambda_i^*(\theta^{(h)})$ Coordinator estimates $\hat{P}_i(k)^{(h)}$ and $\hat{s}_i(k)^{(h)}$ $h := h + 1$ **until** $\|\eta_i^h - \eta^{h-1}\| \leq \epsilon$ Coordinator computes d_i using (??)**Negotiation Phase:**Coordinator initializes $\theta^{(0)}$ $p := 0$ **repeat**Subsystems solve (??), and send $\lambda_i^*(\theta^{(p)})$ Coordinator updates allocation (??) using adequate versions of λ_i for each agent: $\lambda_i^*(\theta^{(p)})$, if $d_i = 0$ and $\lambda_{i_{\text{rec}}}$, if $d_i = 1$ $p := p + 1$ **until** $\|\theta^{(p)} - \theta^{(p-1)}\| \leq \epsilon$



Algorithm 2: Quantity decomposition based DMPC.

Coordinator initializes $\theta^{(0)}$

$p := 0$

repeat

 Subsystems solve (??), and send $\lambda_i^*(\theta^{(p)})$

 Coordinator updates allocations (??)

$p := p + 1$

until $\|\theta^{(p)} - \theta^{(p-1)}\| \leq \epsilon$



① 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.



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

- ① Resource allocation based DMPC is vulnerable to attacks.
- ② Sub-problems structure has time invariant parameters.
- ③ Attack can be estimated using these parameters.
- Outlook
 - Inequality Constraints yield Hybrid behavior
 - Non-linear attack model



For Further Reading I

-  J. M. Maestre, R. R. Negenborn *et al.*
Distributed Model Predictive Control made easy.
Springer, 2014, vol. 69.
-  P. Velarde, J. M. Maestre, H. Ishii, and R. R. Negenborn,
“Scenario-based defense mechanism for distributed model predictive control,”
2017 IEEE 56th Annual Conference on Decision and Control (CDC). IEEE, Dec
2017, pp. 6171–6176.
-  S. Someone.
On this and that.
Journal of This and That, 2(1):50–100, 2000.

Questions?

Repository

<https://github.com/Accacio/SysTol-21>



Contact

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