

(0384) Distributed optimization in energy communities: a focus on flexibility provision



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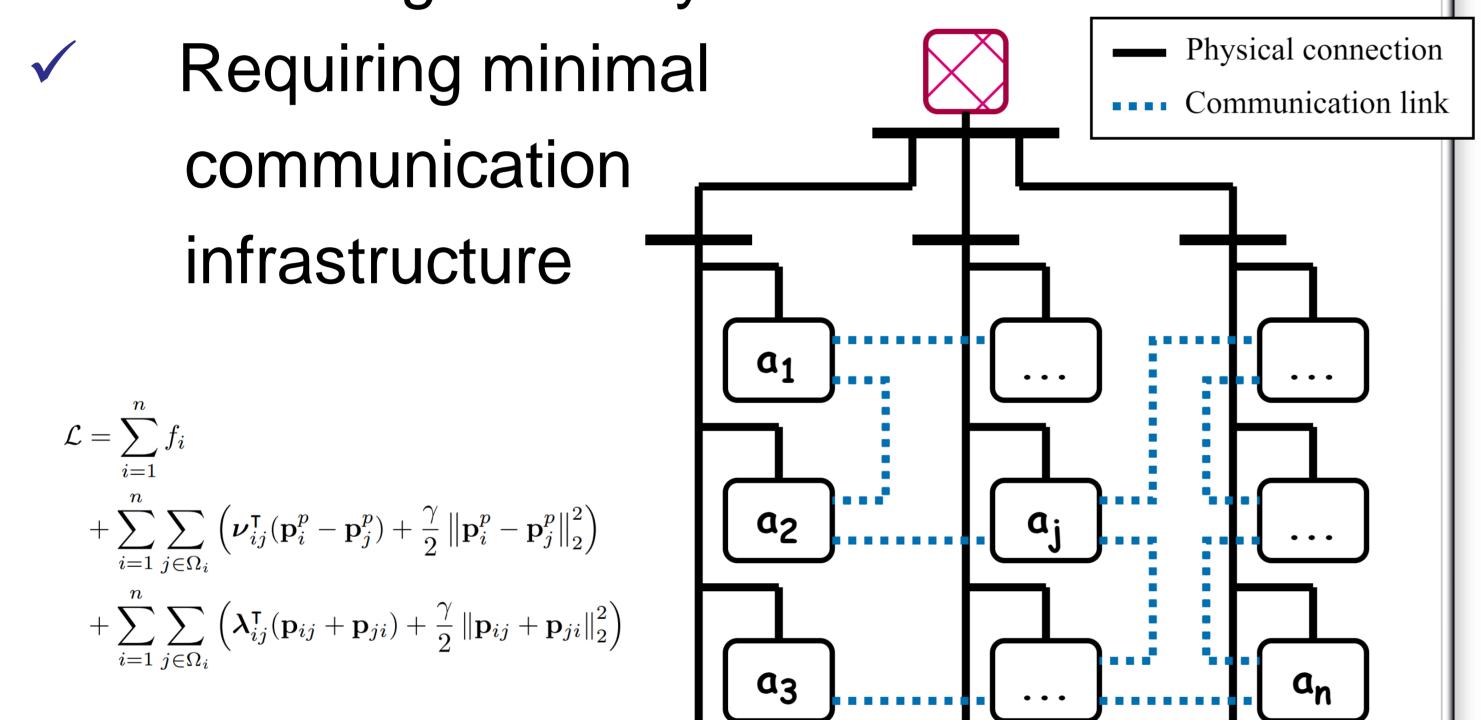
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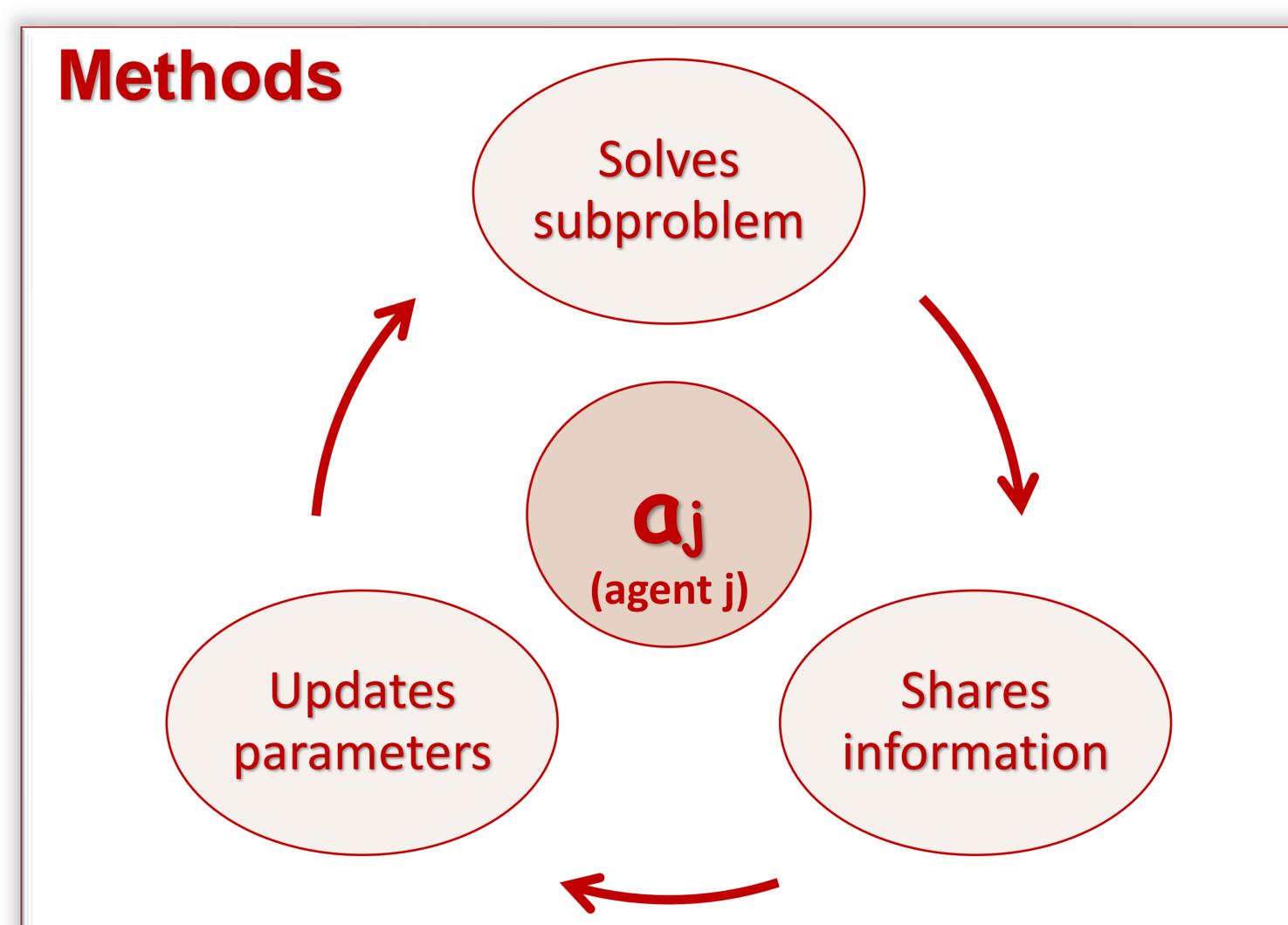
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Introduction

In this work, we propose a distributed optimization algorithm to manage the energy consumption of a multi-agent network (energy community) that owns a microgrid, addressing key aspects such as:

- Achieving optimal operational costs
- No need for a central controller
- Ensuring the protection of sensitive data
- Enabling flexibility services

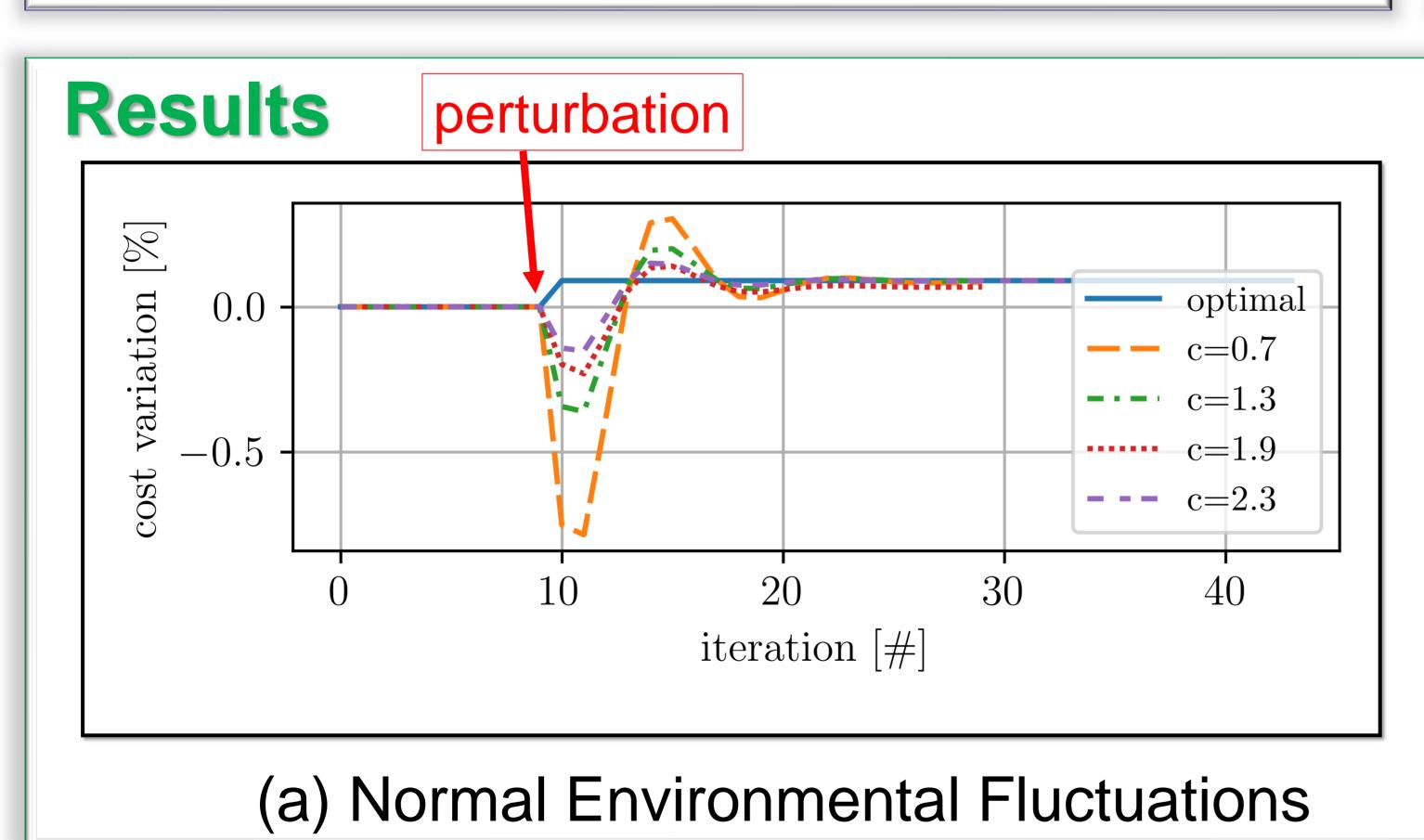


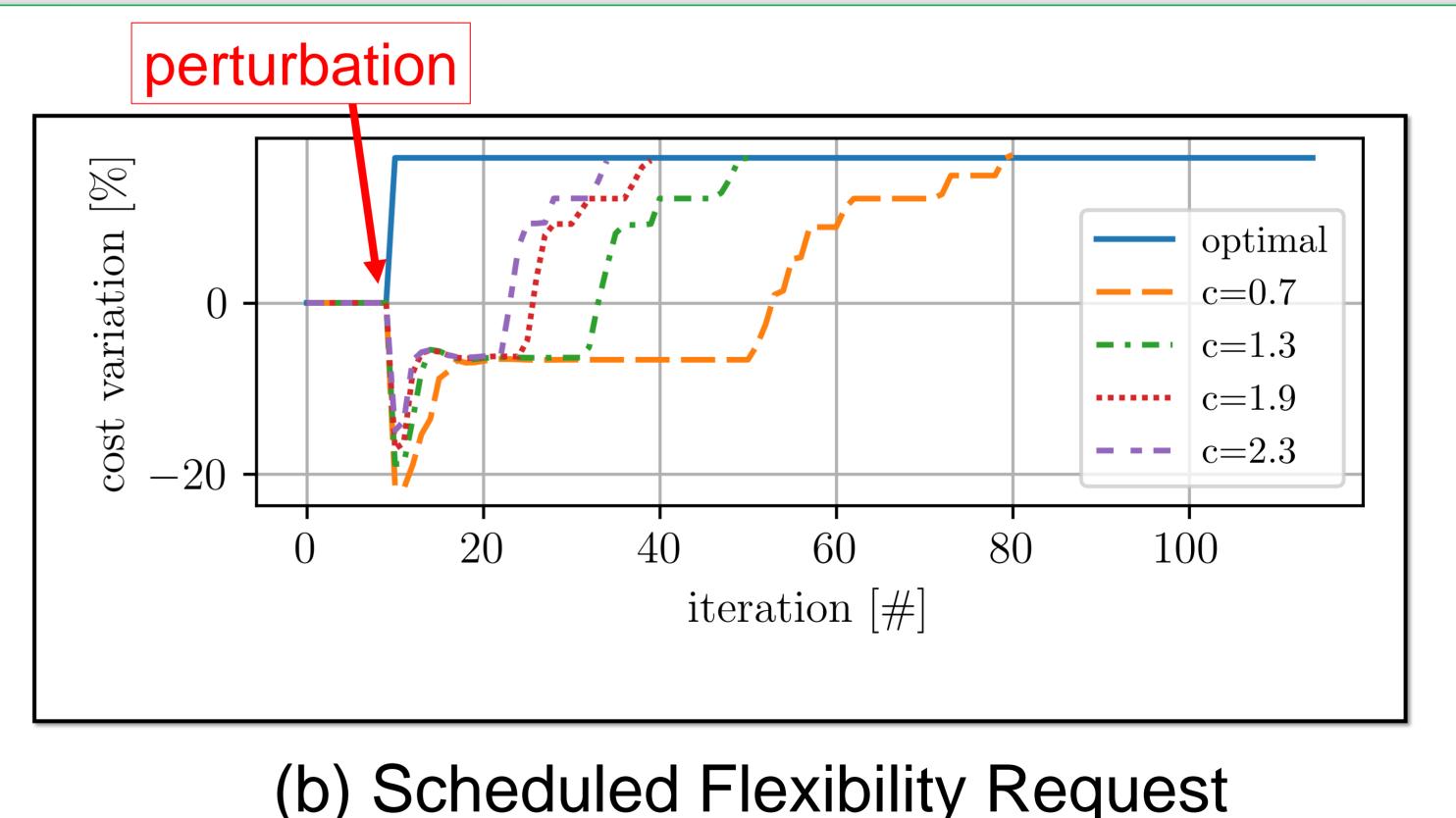


Subproblem: Economic Dispatch formulation over a planning horizon, decomposed through the Auxiliary Problem Principle technique.

Information Shared: The amount of power virtually exchanged with each neighbor and the power purchased from the utility grid.

Parameters Updated: Subproblem dual variables and neighbors shared information.





Conclusion

- There is ample room for the selection of the tuning parameters.
- The convergence properties remain stable after perturbations.
- Further research is needed for virtual energy communities (through public infrastructure).
- Parallel computation and simulation of communication delays would contribute to the evaluation of the speed of the algorithm.

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