

# Certifying Global Optimality of AC-OPF Solutions via sparse polynomial optimization

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**Abstract:** this talk reports the experimental results on certifying 1% global optimality of solutions of alternative current-optimal power flow (AC-OPF) instances from PGLiB [1] with up to 24464 buses via the CS-TSSOS hierarchy [2] - a moment-SOS based hierarchy for polynomial optimization, that exploits both correlative and term sparsity. Our hierarchy can provide tighter semidefinite relaxations than Shor's relaxation. Our numerical experiments demonstrate that the CS-TSSOS hierarchy scales well with the problem size and is indeed useful in certifying 1% global optimality of solutions for large-scale real world problem, e.g., the AC-OPF problem. In particular, we are able to certify 1% global optimality for an AC-OPF instance with 6515 buses involving 14398 real variables and 63577 constraints. This talk is based on the recent preprint [3].

## References:

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