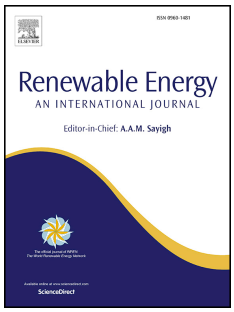
Accepted Manuscript



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PII: S0960-1481(18)30363-X

DOI: 10.1016/j.renene.2018.03.052

Reference: RENE 9921

To appear in: *Renewable Energy*

Received Date: 15 July 2017

Revised Date: 7 March 2018

Accepted Date: 20 March 2018

Please cite this article as: Wilson D, Rodrigues S, Segura C, Loshchilov I, Hutter F, Buenfil GuillermoLó, Kheiri A, Keedwell E, Ocampo-Pineda M, Özcan E, Peña SIV, Goldman B, Rionda SB, Hernández-Aguirre A, Veeramachaneni K, Cussat-Blanc S, Evolutionary computation for wind farm layout optimization, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.03.052.

Evolutionary computation for wind farm layout optimization

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Abstract

This paper presents the results of the second edition of the Wind Farm Layout Optimization Competition, which was held at the 22^{nd} Genetic and Evolutionary Computation COnference (GECCO) in 2015. During this competition, competitors were tasked with optimizing the layouts of five generated wind farms based on a simplified cost of energy evaluation function of the wind farm layouts. Online and offline APIs were implemented in C++, Java, Matlab and Python for this competition to offer a common framework for the competitors. The top four approaches out of eight participating teams are presented in this paper and their results are compared. All of the competitors' algorithms use evolutionary computation, the research field of the conference at which the competition was held. Competitors were able to downscale the optimization problem size (number of parameters) by casting the wind farm layout problem as a geometric optimization problem. This strongly reduces the number of evaluations (limited in the scope of this competition) with extremely promising results.

Keywords: Wind farm layout optimization, evolutionary algorithm, competition