## MF application to innovative wind generators

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ABSTRACT Genetic optimization techniques are more and more frequently applied to the design of complex systems and components in today's industry applications. Special electric machines are among the most important components which can be effectively improved and optimized with the use of genetic optimization algorithms and tools available in the modeFrontier software package. In this presentation the experience of Ansaldo Sistemi Industriali is illustrated showing modeFrontier practical application to the optimized design of innovative wind generators of different size and conception. The focus is particularly placed on a small-size permanent-magnet 20-kVA alternator prototype featuring a special slotless stator design to meet highly demanding requirements on cogging torque minimization under efficiency and production cost constraints. The generator sizing and detailed design have been accomplished by interfacing electromagnetic and thermal finite-element computation programs into the modeFrontier multi-objective constrained optimization environment. This has made it possible to identify the most promising design configuration in absence of previous industrial experiences on electric machines with similar characteristics. The generator prototype has been manufactured and tested showing the effectiveness of the optimization design approach based on modeFrontier software.