

## Abstract

The optimization of a process and the increase in its performances remain permanent challenges with any industry. In the field of the electrical energy production, often the increase in the turbomachinery performances is very required. One of the ways which make it possible to achieve this goal is the design of new machines starting from existing machines. This present work integrates this step by using the concepts of evaporative cooler and scale factor. The analysis of the results of the reception essays of the initial machine allowed validating the theoretical calculation started, and the results are used to determine the expression of the scale factors for the new machines design. A study of performance of the designed machine is carried out by using this concept as well as the use of a system of cooling of the combustion air (the evaporative cooler). The machines designed by using this processes involve a considerable gain in performances what induces a better environmental protection by the reduction of the emissions. An approximate calculation of the scale factor, and performances was also carried out numerically