DEVELOPMENT OF ONLINE RESOURCES TO ASSESS THE EFFECTIVENESS OF SOME GAS TURBINE PLANTS

Ochkov V.F.,[1] ***Ustyuzhanin E.E.,***[*1] ***Znamensky B.E.,***[1]
Rykov S. V.,[2] ***Rykov V.A.***[2]

[1]*MPEI (TU), Moscow, Russia,* [2]*SPbSU ITMO, Saint-Petersburg, Russia*
[*]*evgust@gmail.com*

An analysis of Internet resources is fulfilled in the report. The resources contain such information as: (a) data on the thermal properties, $R = (\rho, h, s \ldots)$, of substances, (b) numerical data on the energy criteria Z of gas turbine plants (GTP). It is shown that currently typical Internet resources have the form of text files. These resources are developed in a number of organizations (JIHT RAS, NIST etc.). For example, such a file contains tabulated R properties and does not use the software to calculate these properties. The resources allow the client to implement a number of options. The latter include: (a) "introduction" of boundary conditions, $Y = (p, T \ldots)$, (b) "calculation" of the value of R using the software (SW) in the form of "exe-file", here p, T are the pressure and the temperature those are the arguments in the exe-file to calculate $R(p, T)$. In this case, the exe-file is closed to the user: there is no such option as "copying" the mathematical formula, $R(p, T)$, used for the calculation of the R property of the working substance. Some researchers have designed Internet resources to calculate the properties of R. These researchers include the authors of this report. This SW has the form of an open interactive Internet resource (OI). The computational part of the OI-resource is connected: (1) with the formula, $R(p, T)$, or with the equation of state (EOS), which calculates R property, 2) with Mathcad code named Code_1(R, Y). The code let us determine R property. The interactive part of the OI-resource is based on the computer science and Internet technologies.

We have considered the methodological techniques and tools, which can be used: (a) to create an OI-resource, (b) to place the OS-resource on a remote server, (c) to implement a number of new options for clients. These options include, for example, "copying" the mathematical formula/EOS or the code as a whole. In the report, OI-resources are focused on the joint use of some tools: (1) the code used for the design of a power plants, (2) OI-resource that allows us to calculate R properties at specified points of GTP cycle. We have got some results obtained on the basis of these resources. These results are discussed, including data on the internal efficiency, $Z_1(R, Y)$, of some GTP, here: $Y =$ (Y_1 is the temperature at the entrance to the turbine unit, Y_2 is the degree of the pressure increase in the compressor unit, etc.). The optimization of the objective function, $Z_1(R, Y)$, of GTP is performed.