Live IAPWS Formulations

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New trends in the publication of thermophysical properties data for chemical substances are reviewed using, as an example, the properties of water and steam – the principal heat carriers and working bodies in thermal and nuclear power industries. The advantages and disadvantages of traditional publication on paper are examined in comparison with the modern electronic delivery via Internet. One important requirement for the latter is the inclusion of interactive calculations. Additional requirements for online calculation tools may include low or no cost to the users, multiple platforms (Windows, Android, Linux etc.), multilingual interface (English, Russian, Chinese, German, Spanish, etc.), traditional math operators and functions, 2D and 3D graphic capabilities, animation, numerical and symbolic math, tools for solving equation systems (algebraic, differential, etc.), derivatives, integrals, as well as programming tools for setting conditions, local functions, etc. Using of computer animation for verification of functions for calculating thermophysical properties of substances is reviewed. An analysis of relevant Internet resources is given. Certain aspects of the work of the International Association for the Properties of Water and Steam (IAPWS) are described. New information technologies are described for publishing the data on thermophysical properties of substances using IAPWS formulations that can trace the errors in the code and optimize calculation process. Specific examples are provided of the development of modern IT resources for the modeling of the properties of chemical substances, including handbooks, desktop calculation software, downloadable online calculations, and calculations that use server technologies such as Mathcad Calculation Server (see the site of National Research University “Moscow Power Engineering Institute”) and SMath (see the site of Knovel, an Elsevier company).