

Simulis® Thermodynamics: an open framework for users and developers

Olivier Baudouin, Alain Vacher, Stéphane Déchelotte

ProSim SA, Stratège Bâtiment A, BP 27210, F-31672 Labège Cedex, France

Simulis® is the name of ProSim's new software suite. The component-oriented approach of its architecture is based on the Microsoft®'s COM/DCOM middleware. Simulis® Thermodynamics, one of the first components, is a thermophysical calculation server that generates highly accurate pure component and mixture properties (thermodynamic, transport, compressibility...) and fluid phase equilibria (liquid-vapor, liquid-liquid and liquid-liquid-vapor). The standard version of Simulis® Thermodynamics is provided as an add-in in Microsoft® Excel or as a toolbox in MATLAB® and enables the user to run complete thermodynamic calculations in these applications, but it can also be plugged in any legacy code using the SDK (Software Development Kit). One main benefit of Simulis® Thermodynamics is its CAPE-OPEN compliance through its implementation of the CAPE-OPEN standardized interfaces: "thermodynamic plug" and "thermodynamic socket". Another main benefit is the capability to embed legacy codes either as a DLL (Dynamic Link Library) following a standard syntax, either as VBScript (Visual Basic Script) directly written from the Simulis® Thermodynamics' environment. Then, the user code inherits of all the features of Simulis® Thermodynamics: CAPE-OPEN compliance, Microsoft® Excel add-in, MATLAB® toolbox ... Also, beside the description of all these different features, several examples will be presented. Particularly, expert mode of Simulis® Thermodynamics (functionality allowing the users to implement their own models in Simulis® Thermodynamics) will be highlighted by introducing what was made with the code REFPROP developed by the NIST (US Department of Commerce) for fluid properties calculation.