Hochschule Zittau/Görlitz
UNIVERSITY OF APPLIED SCIENCES

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Research Activities on the Thermodynamic Properties of Water and Steam

Report "Research in Progress 2012"

Projects

1. Development of Fast Property Algorithms Based on Spline Interpolation
   - The algorithms for fast spline-interpolation methods was developed and applied to the calculation of thermodynamic properties of water and steam in CFD and non-stationary calculations.
   - An algorithm for generating spline-interpolation data grids with optimized data density for the user requirements ‘range of state’ and ‘accuracy’ was developed.

2. Stoffwerte für Wasser und Wasserdampf (Steam Tables for Water and Steam),VDI Wärme Atlas 2012

   Section D2.1 “Stoffwerte für Wasser und Wasserdampf” (Properties of Water and Steam) of the VDI-Wärme Atlas 2012 (VDI-Heat Atlas), 11th German Edition, is being worked on. The reference for this publication will read: *Wagner, W. and Kretzschmar, H.-J.*, Stoffwerte von Wasser und Wasserdampf, VDI-Wärmeatlas, 11. Auflage, Abschnitt D2.1, pp. 1-15, Springer-Verlag, Berlin. Status: The proofs are being checked.

3. Property Libraries for Calculating Heat Cycles
   - The property library LibIF97 for steam and water has been extended to ice properties including sublimation and melting pressures.
   - The property libraries for steam, water, ice, seawater, humid combustion gases, humid air, ammonia/water mixtures and water/lithium bromide mixtures have been connected to LabVIEW.
   - An Online Property Calculator for calculating thermodynamic and transport properties for steam, water and other working fluids in power engineering was installed on the website www.thermodynamics-zittau.com.
   - A steam tables App for iPhone, iPad, and iPod touch has been developed.
   - A student version of the steam tables program FluidLAB for MATLAB was prepared and its link installed on the IAPWS Website www.iapws.org under "Education".

Recent Publications

Kretzschmar, H.-J., Kraft, I.:
Kleine Formelsammlung Technische Thermodynamik, 4. Auflage.
Carl Hanser Verlag, München (2011)

Kretzschmar, H.-J.:
Bereitstellung von thermodynamischen Stoffdaten für Arbeitsfluide der Energietechnik.
In: Aktuelle Beiträge zur Technischen Thermodynamik, Energietechnik und Fernwärmeversorgung,
Verlag AGFW, Frankfurt am Main (2011)

Herrmann, S.; Kretzschmar, H.-J.; Gattley, D. P.:
Berechnung der thermodynamischen Eigenschaften von feuchter Luft.
KI - Kälte Luft Klimatechnik, 48 (2012) S. 22-28

Kunick, M; Kretzschmar, H.-J.; Gampe, U.:
Schnelle und flexible Berechnung thermodynamischer Stoffwerte mit Spline-Interpolation für die Modellierung instationärer Energieumwandlungsprozesse.
In: W. Honekamp, P. Schindler, Tagungsband der 13. Nachwuchswissenschaftlerkonferenz mitteldeutscher Fachhochschulen Görlitz, S.209-214, Re Di Roma-Verlag, Remscheid (2012), ISBN 978-3-86870-436-5

Kretzschmar, H.-J., Stöcker, I.:
Mollier h,s-Diagramm von Wasserdampf (*Mollier h-s* Diagram for Steam).
Siemens Energy, Erlangen (2012)