HOCHSCHULE ZITTAU/GÖRLITZ (FH) - University of Applied Sciences

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Research Activities on the Thermodynamic Properties of Water and Steam
Report "Research in Progress 2004"

1. Supplementary backward equations $p(h,s)$ for regions 1 and 2 of IAPWS-IF97
   - The comprehensive article on the backward equations $p(h,s)$ in regions 1 and 2 was finished and finally accepted by the "Journal of Engineering for Gas Turbines and Power".

2. Supplementary backward equations $T(p,h)$, $v(p,h)$, and $T(p,s)$, $v(p,s)$ for region 3 of IAPWS-IF97
   - In addition to the backward equations $T(p,h)$, $v(p,h)$, and $T(p,s)$, $v(p,s)$, equations $p_{sat}(h)$ and $p_{sat}(s)$ for the region boundary between region 3 and wet-steam region 4 were developed.
   - The Draft of "Revised Supplementary Release on Backward Equations for the Functions $T(p,h)$, $v(p,h)$, and $T(p,s)$, $v(p,s)$ for region 3 of the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam" was prepared.
   - The evaluation of the revised release was supported.
   - The comprehensive article on the backward and boundary equations was prepared.

3. Supplementary backward and boundary equations $p(h,s)$ for region 3 of IAPWS-IF97
   - The evaluation of the "Supplementary Release on Backward Equations $p(h,s)$ for Region 3, Equations as a Function of h and s for the Region Boundaries, and an Equation $T_{sat}(h,s)$ for Wet Steam of the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam" was supported.

4. Supplementary backward equations $v(p,T)$ for region 3 of IAPWS-IF97
   - The development of backward equations $v(p,T)$ in region 3 was completed.
   - The Draft of "Supplementary Release on Backward Equations for Specific Volume as a Function of Pressure and Temperature $v(p,T)$ for region 3 of the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam" was prepared.

5. Investigations on thermodynamic properties of humid air - part of the project "Advanced Adiabatic Compressed Air Energy Storage" (AA-CAES) of the European Union

   - The property data base for humid air was completed.

   - Comparison calculations of different models for calculating thermodynamic properties of humid air were performed.

6. Property libraries for water and steam, combustion Gas mixtures, and humid air

   - The program libraries

     FluidEXL for Excel$^®$

     FluidMAT for Mathcad$^®$

   were extended .

7. Implementation of the industrial formulation IAPWS-IF97 on pocket calculators

   - The program FluidTI for the model TI 83 of Texas Instruments was prepared.

Zittau, August 25, 2004

H.-J. Kretzschmar