Minutes of the IAPWS working group IRS

Dresden, 12. – 15. September 2016

(Numbering of topics follows TPWS agenda)

0. W. Wagner, in memory of Professor P.G. Hill

1. Ingo Weber opened the session for IRS at about 10:15 am, 12. September 2016. The agenda was adopted without changes.

2. Adam Nový was appointed clerk of minutes.

3. Covered in TPWS / SCSW minutes.

4. Industrial Requirements and Solutions for Steam Property Calculations

4.1. Report of the Task Group “Industrial Advisory Note”

Ingo Weber gave information, that M. Hiegemann could not be present and no progress in project is known.

TODO: I. Weber will check the status from M. Hiegemann, and the plan for the next year, otherwise the task is to be closed. H.J. Kretzschmar proposed for obtaining possible input from PCC group to be suggested to M. Hiegemann.

4.2. Large Eddy simulation of condensing steam in turbine cascade

F. di Mare from DLR institute gave a presentation on LES where efficient tabular description of thermodynamic properties is usable for solving complex problems using scale independent statistical modeling. It was the application of SBTL into CFD code done with help of M. Kunick and H.J. Kretzschmar. It was reported significant speed up compared to conventional IAPWS-IF97 and also the advantage of smooth phase and regions boundaries for minimizing convergence issues. Future perspective for high order, shock resolving calculations with explicit discretization for LES. Try similar approach to combustion and supercritical cycles.

Discussion: J. Cooper comments to consider droplets simulation approaches

5 - 15. Covered in TPWS / SCSW minutes.

16-IRS. Discussion on the future of IRS

16.1. IRS mission and activities

N. Okita presented possible areas of interest regarding the IRS group focus. The areas of possible support and particular topics presented were put together by Japanese National Committee and the Toshiba company. There were three main IRS goals highlighted.

A. Identify and prioritize industrial requirement
B. Deliver solutions
C. Support implementation

There were also specific areas of interest outlined including: wet steam (flow analysis, wetness measurement, erosion), frost/defrost/freezing/antifreezing (phase change study and molecular simulation) and thermal ice storage (static, slurry). Some topics are partially covered by existing ICRNs some not.

Discussion: B. Rukes pointed out, that many topics are being new to IAPWS and it is not sure if IAPWS wants to deal with it and that IRS should focus on topics already in scope of IAPWS. H. J. Kretzschmar came with idea of attracting new researchers and people for the next meeting/conference. I. Weber suggested to prepare list of topics properly categorized for the next meeting, based on the presentation of N. Okita, this leading to TG setup. Other discussed topic was the wet steam, IRS concluded to setup TG to find out how the properties are calculated in the industry.

TODO:

TG: N. Okita, I. Weber: internal IAPWS survey to be available to every IRS member. The target is to collect, sort and categorize "items" and evaluate the distance to IAPWS business and what kind of people is needed to solve it. Starting point will be the categories to be presented to IRS members.

TG: I. Weber, H.J.Kretzschmar, N.Okita, A. Nový: Wet steam properties survey, with target of finding out, how are in practical (industry companies) calculated/estimated the properties of wet steam, especially speed of sound, viscosity, thermal conductivity, etc.

17-IRS. IAPWS Certified Research Needs (ICRNs)

N. Okita presented potential ICRN topics based on items presented in 16.1. It was decided not to go forward with specific ICRNs until the needs are properly sorted and addressed by the IRS.

18. Covered in TPWS / SCSW minutes.

19. Other business:

19.1. no report on International Collaboration Projects

19.2 IRS voted on Ingo Weber to be the IRS representative for the Gibbs Award Committee

20. Membership

Tobias Loew (Germany) was proposed as new IRS member by H. J. Kretzschmar and seconded by R. Pawelek

IRS unanimously accepted this new member

21. Election of new chair for IRS

I. Weber steps down after 6 years of excellent work, I. Weber proposing usual chairmanship rotation. As a new chair proposed N. Okita (Toshiba) and Vicechair A. Nový (Doosan Skoda Power).

Proposal was unanimously accepted by IRS and be suggested to EC

22. Contribution to Press release will be done by the WG chair

23. Formal motion to the EC will be prepared by the WG chair

24. The IRS meeting was adjourned 15. September 2016, about 3:10 pm.

Agenda for the IAPWS Working Group
Industrial Requirements and Solutions (IRS)
Dresden, Germany, September 12-15, 2016

(Numbering of topics follows TPWS agenda, except where denoted "…-IRS")

1. Opening Remarks; Adoption of Agenda
2. Appointment of Clerk of Minutes
3. Potential International Collaborative Projects [Monday]
4. Industrial Requirements and Solutions for Steam Property Calculations, joint with WG TPWS (Monday)
   - 4.1 Report of the Task Group "Industrial Advisory Note" (M. Hiegemann, B. Rukes, A. Singh, A. Harvey)
   - 4.2 Large eddy simulation of condensing steam in a turbine cascade (F. di Mare)
5. Editorial Changes for IAPWS Industrial Documents (joint with WG TPWS and SC SW) (Monday)
   - 5.1 Report on proposed Editorial Changes on the Revised 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 (M. Kunick, H.-J. Kretzschmar, W. Wagner, A. H. Harvey)
   - 5.2 Formal consideration of the Editorial changes to the Supplementary Release
   - 5.3 Report of proposed editorial changes to Advisory Note 5: Industrial Calculation of the Thermodynamic Properties of Seawater (S. Herrmann, H.-J. Kretzschmar, K. Orlov)
   - 5.4 Formal consideration of the Editorial changes to the Advisory Note
6. Heavy Water Properties (joint with WG TPWS)
   - 6.1 Report of Task Group on Heavy Water Thermodynamic Properties (R. Span, A. Harvey, S. Herrig)
   - 6.2 Appointment of Evaluation Task Group for Heavy Water Formulation
   - 6.3 Report of TG for Heavy Water Transport Properties (J. Sengers, M. Assael, M. Huber, R. Perkins)
   - 6.4 Measurements of the Viscosity of Supercooled D_2O (Pierre Ragueneau, Amine Dehaoui, Bruno Issenmann, Frédéric Caupin)
   - 6.5 Measurement of the Density of Supercooled D_2O up to 100 MPa (M. Duška, J. Hrubý)
8. Report of Task Group on Surface Tension of Ordinary Water (joint with WG IRS and SC SW) (V. Vinš, A. Harvey, O. Hellmuth, V. Holten, J. Hrubý, J. Kalova, R. Mareš, J. Patek)

11. Report of Task Group on Extension of Range of Formulation for Thermodynamic Properties of Sea Water (joint with WGs TPWS and SC SW) (R. Feistel) (Tuesday)

15. Reports on miscellaneous TPWS scientific topics (joint with WG TPWS and SC SW)

15.1 Report of Task Group on Covariance in IAPWS work (R. Feistel, J. Hruby, S. Seitz, J. Lovell-Smith, D. Friend)

16-IRS. Discussion on the future of IRS [Thursday morning]

16.1 IRS mission and activities (N. Okita)

17-IRS. IAPWS Certified Research Needs (ICRNs)

17.1 Potential new ICRNs (N. Okita)

18. Reports on other TPWS activities

18.1 Guideline on Fundamental Constants (A. Harvey)

18.2 Advisory Note 2 (J. Cooper, A. Harvey)

18.3 Completion and adoption of the IAPWS Guideline on the Fast Calculation of Steam and Water Properties with the Spline-Based Table Look-Up Method SBTL (M. Kunick, H.-J. Kretzschmar, F. di Mare, J. Hrubý, V. Vinš, I. Weber, R. Pawellek, A. Novi, A., D.G. Friend, and A.H. Harvey)

19. Other Business

19.1 Report on International Collaborative Projects

19.2 Gibbs Award Committee Representative

20. Membership

21-IRS. Election of new chair for IRS

22-IRS. Contribution to Press Release

23-IRS. Preparation of the Formal Motion to the EC

24-IRS. Adjournment

September 15, 2016

I. Weber (Chair)