Fun with fluid properties

By Nicholas W Fette, 2015-02-11

Let’s compare [1] and [2]. The book [1] is cited by 14 articles (according to scholar.google.com as of 2015-02-11) including [3], which in turn is cited by 76 articles (according to scitation.aip.org as of 2015-02-11) and is used in REFPROP9. The journal publication [2] was published seven years later and was cited by 1151 articles (according to scitation.aip.org as of 2015-02-11).

We should observe and clarify the discrepancy between these two sources. Most likely the more recent publication takes precedence. The discrepancy is in the two columns in a table of coefficients.

|  |  |  |
| --- | --- | --- |
|  | Book [1] | IAPWS Article [2] |
| Equation (page) | 7.5 (81) | 6.6 (429) |
| Table (page) | 7.2 (83) | 6.2 (430) |
| Coefficient appearing in |  |  |
| Coefficient appearing in |  |  |
| Values of | (55,56) -> (28,32) | (55,56)->(0.2,0.2) |
| Values of | (55,56) -> (0.2, 0.2) | (55,56) -> (28,32) |

# Bibliography

|  |  |
| --- | --- |
| [1] | A. Pruß and W. Wagner, Eine neue Fundamentalgleichung für das fluide Zustandsgebiet von Wasser für Temperaturen von der Schmelzlinie bis zu 1273 K bei Drücken bis zu 1000 MPa, VDI-Verlag, 1995. |
| [2] | W. Wagner and A. Pruß, "The IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use," *Journal of Physical and Chemical Reference Data,* vol. 31, no. 2, pp. 387-535, 2002. |
| [3] | R. Tillner-Roth and D. G. Friend, "A Helmholtz Free Energy Formulation of the Thermodynamic Properties of the Mixture {Water + Ammonia}," *Journal of Physical and Chemical Reference Data,* vol. 27, no. 1, pp. 63-96, 1998. |