Planning and Justification of Thermophysical Research: a Data Aspect

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Thermophysical research is usually motivated by practical needs or the needs of theory development. It increases the amount of available data, which, in turn, reveals additional issues requiring further attention. Two kinds of issues can be revealed: inconsistencies and anomalies. Inconsistencies happen when different values are obtained for the same property (measured experimentally in different laboratories, predicted theoretically, correlated, or derived from other data). They typically require additional highly reliable experiments or accurate theoretical verification. If the value is known with high confidence but is inconsistent with correlations or predictions, that is an anomaly. It requires further theoretical insight. TRC Source database containing more than 7.5 million data points in combination with its expert tools allows revealing those issues automatically. If they cannot be resolved with the available methods and expertise, they may justify additional experimental or theoretical research. Such a research would also be justified by the factors lead to the initial measurements and the need to advance the theory to describe this phenomenon. The presentation will show the methods and techniques used to reveal data issues at TRC, give an overview and examples of the recognized problems, as well as the issues resolved in the past. A service sharing them with the community is proposed.