AKI 1 Semantische Kodierung physikalischer Information

Zeit: Dienstag 10:30–11:30 Raum: I

Fachvortrag AKI 1.1 Di 10:30 I

Web-search of Physics Content - The concept of Physics Markup Language — •Eberhard Hilf and Michael Schlenker — Institute for Science Networking Oldenburg

Field specific Markup Languages are needed to enable authors to encode the scientific content of a document such that retrieval engines can be used to find it. A Physics Markup Language PML is still to be set up, while for mathematical content MathML, and for chemistry CML is already in use.

The concept has to start from a class of primary objects, with their properties to be attached. In physics this is the physical observable (like momentum, charge, ..) with its properties such as the respective mathematical object and its algebra, the physical dimension, the experimental setup and range, etc.

For a small but suited subfield of physics, thermodynamics, a demonstration of how PML works, is given. PML as all markup languages has to be internationally agreed on. The status of PML in IUPAP is given.

PML will revolutionize the daily work, searching for physics content in the web, automatic checking of algebraic and dimensional formulae of online publications, etc.

Fachvortrag AKI 1.2 Di 10:50 I

Capturing the Content of Physics — •Michael Kohlhase — International University Bremen, School of Engineering & Science

Today's scientific documents are *machine-readable*, therefore we can publish them on the web, send them in e-mails, and search for words in them via Google. However, we cannot search for a relevant experiment, check dimensions in equations, or change units or coordinate systems in an exposition. For this we would have to make the documents also *machine-understandable* by capturing the content of the embedded knowledge. To facilitate this, we propose to realize a content markup language PhysML by extending the OMDoc format (Open Mathematical Documents) initially developed as a content-markup format for mathematical documents by an infrastructure for physics, concentrating on *observables*, *systems*, and *experiments*. The semantic information embedded in OMDoc documents has been used e.g. by eLearning systems to automate user-adaption of course materials or for semantic search for mathematical formulae. OMDoc marks up knowledge on three levels:
-(Object Level) it uses OpenMath and content MathML for objects represented as mathematical formulae;
-(Statement Level) OMDoc provides original markup primitives that allow to specify the semantical structure and interdependencies of theorems, axioms, definitions, proofs;
-(Context-Level) statements are grouped into mathematical theories, whose structure can be expressed by a rich set of theory morphisms.
Our extension only changes the statement level; the object and context levels stay the same: they model the general "scientific method".

Fachvortrag AKI 1.3 Di 11:10 I

Nutzung von Semantik-Web Techniken zur Integration von Fachportalen — •Thomas Severiens — Fachbereich Mathematik/Informatik, Universität Osnabrück

Der Vortrag zeigt am praktischen Beispiel des PhysNet (www.physnet.net), wie sich RDF-Tripel zur flexiblen und offenen Speicherung von Informationen in Fachportalen nutzen lassen, wie sich externe Datenquellen dynamisch mittels XQuery- und WebService Schnittstellen integrieren lassen und diese Techniken in Fachportalen anderer verwandter Disziplinen genutzt werden können. Der Aufbau von Fach-Communities und die Distribution eines Nutzer-orientierten Dienstes stellen dabei eine besondere Herausforderung dar. Lösungen und Ansätze werden an praktischen und implementierten Beispielen gezeigt und erklärt.