PHYSML

ConTEXt XML

Pragma ADE / Hasselt NL

Description

This module runs on top of the MATHML filters and provide a way to add units to formulas. Since a unit is a property of a component of a formula, one can imagine it being defined as an attribute to math elements. In that case, a typesetting engine should be clever enough to figure out the final unit. Since this kind of artificial intelligence is beyond what CONTEXT can offer you, we stick to a simpler method, based on the already present units engine.

The CONTEXT units engine is responsible for a consistent representation of units, not only in the symbols used, but also in correct spacing (for what it's worth).

Structure

To save keystrokes (and bytes), a simple way to represent a number or variable with a unit is the following quick and dirty way.

```
<phys>
  <cn> 10 </cn>
  <cu> <Newton/> <Square/> <Meter/> <Per/> <Sec/> </cu>
</phys>
```

$$10\ \mathrm{Nm^2/s}$$

We could have used <pn> and <pi> but after some experiments we found out that this is confusing when with formula rich of π's.

A more content MATHML–like way of defining a unit is:

```
<phys> <apply> <unit/>
  <cn> 10 </cn>
  <csymbol> <Square/> <Meter/> <Per/> <Sec/> </csymbol>
</apply> </phys>
```

$$10\ \mathrm{m}^2/\mathrm{s}$$

Or, more compact:

```
<phys> <apply> <unit/>
  <cn> 10 </cn>
  <cu> <Square/> <Meter/> <Per/> <Sec/> </cu>
</apply> </phys>
```

$$10\ \mathrm{m}^2/\mathrm{s}$$

A bit more complicated example is the following:

```
<phys> <apply> <unit/>
  <apply> <divide/> <ci> a </ci> <cn> 10 </cn> </apply>
  <cu> <Square/> <Meter/> <Per/> <Sec/> </cu>
</apply> </phys>
```

$$\frac{a}{10}\ \mathrm{m^2/s}$$

We also provide an alternative (equivalent) for </cu>, where we reflect the sequential aspect in the name of the element.

```
<phys> <apply> <unit/>
  <cn> 10 </cn>
  <cunseq> <Square/> <Meter/> <Per/> <Sec/> </cunseq>
</apply> </phys>
```

$$10\ \mathrm{m^2/s}$$

In all these examples you will notice that the unit is rather presentational in nature. The sequence entered is similar to a pronounced unit. By using a leading capital we make sure that no conflicts with existing or future MATHML can arise.

There are two special elements. If a unit is on its own, it should be preceded with <Unit/>, as in:

```
Do you know what <phys> <cu> <Unit/> <Newton/> <Square/>
<Meter/> <Per/> <Sec/> </cu> </phys> is used for?
```

Do you know what $\mathrm{Nm^2/s}$ is used for?

The second special element is <NoUnit/>. You can use this one when you use a prefix (like pico) on its own.

```
Do you know what <phys> <cu> <Unit/> <Pico/> <NoUnit/> </cu>
</phys> stands for?
```

Do you know what p stands for?

If we omit `<NoUnit/>` here, the prefix will migrate to the next unit.

```
The meaning of <phys> <cu> <Unit/> <Hertz/> </cu> </phys> is
<unitmeaning label="Hertz"/>.
```

The meaning of Hz is Hertz.

Usage

This module is loaded as any module:

```
\usemodule[physml]
```

XML example

Here we will collect a few examples.

TEX example

Because the components that make up units are in fact synonym entries, you can ask for an overview of used units with their meaning.

```
\placelistofunits
```

Hz	Hertz
m	meter
N	Newton
s	second

Configuring

We will add some more control over spacing, lettering and color later.

Documentation

More information on units can be found in the manual that describes the units module and in the module file itself (`m-units.tex`).

Colofon

This manual is part of the CONTEXT distribution, and is authored and maintained by Hans Hagen & Ton Otten. CONTEXT is developed at PRAGMA ADE, Hasselt, The Netherlands. This manual is produced on October 26, 2001.