Math 480 Final Project

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1 Project Overview

1.1 Group Members

I am working in a group with Dwight Hohnstein and Tanor Missler.

1.2 Project in Brief

Our project is to clean up the documentation for the modules under sage/logic and add it to the reference manual. The related Sage trac tickets are:

- #8790 - logic/logic.py

- #8793 - logic/boolformula.py

- #8794 - logic/logicparser.py

- #8795 - logic/logictable.py

2 Trac Tickets Expounded

2.1 Trac #8790

- improve doctest coverage of logic/logic.py

    - Missing documentation
        * combine(self, statement1, statement2):
        * simplify(self, table):
        * prove(self, statement):
    - Missing doctests
        * get_bit(x, c):
        * eval(toks):
        * eval_ltor_toks(lrtoks):
        * reduce_bins(lrtoks):

* reduce_monos(lrtoks):
* eval_mon_op(args):
* eval_bin_op(args):
* eval_and_op(lval, rval):
* eval_or_op(lval, rval):
* eval_ifthen_op(lval, rval):
* eval_iff_op(lval, rval):
* tokenize(s, toks):

2.2   Trac #8793

* clean up documentation of logic/boolformula.py

2.3   Trac #8794

* clean up documentation of logic/logicparser.py

2.4   Trac #8795

* clean up documentation of logic/logictable.py

2.5   Summary

So basically, what our final project comes down to is as follows: Section 2.1 will add in doctests. Sections 2.2 - 2.4 will change the documentation to the required Sphinx format. From here, we will add our fixes to the reference manual.

3   And now for something completely different. . .

Given that our final project does not really use much math, and therefore any mathematical formulas, and since this homework assignment calls for at least one math formula, section 3 will be devoted to fulfilling this requirement.

I will solve a simple problem requiring Integration by Parts.

Problem: Solve $\int_0^1 x \sin(\pi x) \mathrm{d}x$.

Using integration by parts: $\int u \mathrm{d}v = uv - \int v \mathrm{d}u$.
Let $u = x$, $\mathrm{d}v = \sin(\pi x)\mathrm{d}x$, $\mathrm{d}u = 1\mathrm{d}x$, and $v = -\frac{1}{\pi}\cos(\pi x)$ to get:

$$
x\left(-\frac{1}{\pi}\cos(\pi x)\right) - \int_0^1 \left(-\frac{1}{\pi}\cos(\pi x)\right)\mathrm{d}x
$$

$$
= \left[x\left(-\frac{1}{\pi}\cos(\pi x)\right) + \frac{1}{\pi}\left(\frac{1}{\pi}\sin(\pi x)\right)\right]_0^1
$$

$$
= \left[\frac{1}{\pi}\right] - [0] = \frac{1}{\pi}
$$