Sheaves for Children

Eduardo Ochs*

* Departamento de Física e Matemática
Pólo Universitário de Rio das Ostras
Universidade Federal Fluminense
eduardoochs@gmail.com
http://angg.twu.net/math-b.html#sfc

First-year university students – the "children" of the title – often prefer to start from an interesting particular case, and only then proceed to general statements. How can we make intuitionistic logic, toposes, and sheaves accessible to them?

Let D be a finite subset of $\mathbb{N}^2$. Draw arrows for all the "black pawns moves" between points of D, and let $\mathbf{D}$ be the poset generated by that graph; $\mathbf{D}$ is what we call a "ZDAG", and $\mathbf{Set}^{\mathbf{D}}$ is a "ZDAG-topos". It turns out that the truth-values of a $\mathbf{Set}^{\mathbf{D}}$ can be represented in a very nice way as two-dimensional ASCII diagrams, and that all the operations leading to sheaves and geometric morphisms can be understood via algorithms on diagrams.

In this talk we will present a computer library for performing computations interactively on the truth-values of ZDAG-toposes. The diagrams are rendered in ASCII by default, but there is a module that typesets them in LaTeX.