

The Stern-Brocot Tree: a New Kind of Journey Through The Rationals.

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Abstract

In this talk we will introduce the Stern-Brocot tree and we will analyze and prove several of its properties, in order to show that it can be seen as an alternative number system for representing rationals. Then we will discuss the relation between fractions of the tree and paths on the tree: we will define a path by a string of L 's and R 's, where L and R indicate to move on the left branch and on the right branch of the tree respectively, and we will find its corresponding fraction. In the end we will show, through an algorithm, how we can visualize rational numbers by moving on the tree.

References

- [1] Ronald L. Graham, Donald E. Knuth, Oren Patashnik: *Concrete mathematics: a foundation for computer science - 2nd ed.* Addison-Wesley Publishing Company, 1995.
- [2] Tyler Wade: *Enumerating the rationals via the Stern-Brocot tree.* wordpress.com, Sept 2015.