The Dyck Language

This language is named after the German mathematician Walther von Dyck, who pioneered the study of groups using generators.

The language

$$\Sigma_{\mathcal{D}} := \{(,)\}$$
$$\mathcal{D} := \varepsilon | (\mathcal{D})\mathcal{D}$$

Dyck paths

A Dyck path of length n is a visual representation of all of the words of the Dyck Language which are of the length n.

Edges: - There are two kinds of edges in Dyck Paths. - North East edges $(\Delta x, \Delta y) = (1, 1)$ which corresponds to an opening parenthesis. - South East edges $(\Delta x, \Delta y) = (1, -1)$ which corresponds to a closing parenthesis.

Vertices: - Every vertex in a Dyck path represents a substring of a word of length n in the Dyck Language. - All vertices exist in the first quadrant of the Cartesian plane

Example

```
plot(x^2, (x, 0, 10))
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