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Univalent Polynomials and Hubbard Trees

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We study the space of "external polynomials"

$$\Sigma_d^* := \left\{ f(z) = z + \frac{a_1}{z} + \cdots + \frac{a_d}{z^d} : a_d = -\frac{1}{d} \text{ and } f|_{\hat{\mathbb{C}} \setminus \overline{\mathbb{D}}} \text{ is conformal} \right\}.$$

It is proven that a simple class of combinatorial objects (*bi-angled trees*) classify those $f \in \Sigma_d^*$ with the property that $f(\mathbb{T})$ has the maximal number $d-2$ of double points. We discuss a surprising connection with the class of anti-holomorphic polynomials of degree d with $d-1$ distinct, fixed critical points and their associated Hubbard trees.

References

[1] Lazebnik, Kirill, Makarov, Nikolai, Mukherjee, Sabyasachi. *Univalent Polynomials and Hubbard Trees*, arXiv, 2019.