COMBINATORICS OF FEYNMAN DIAGRAMS LECTURE 27 SUMMARY

WINTER 2018

Summary

With notation and assumptions from the end of last class, Foissy's theorem is

Theorem 1. *The following are equivalent:*

(1) $T(x) = xB_+(f(T(x))$ *is Hopf*

(2) $f(z)$ *is one of the following*
- $f(z) = 1$, *or*
- $f(z) = e^{\alpha z}$, $\alpha \neq 0$, *or*
- $f(z) = (1 - \alpha\beta z)^{-\frac{1}{\beta}}$, $\alpha\beta \neq 0$.

(3) *There exists* α, β *such that*

$$(1 - \alpha\beta z)f'(z) = \alpha f(z)$$
$$f(0) = 1$$

We went over some of the key ideas in the proof. Some of the calculations are also in your assignment. Then we finished with the binary tree example up to order 4 just checking by hand that it really is Hopf.

Next time

Next class we'll think about more physical DSEs.

References

Foissy's paper is arXiv:0707.1204