

Georgetown-1503 Preps

January-19-15 9:10 AM

Title: When does a group have a Taylor expansion?

Plan:

1. The Taylor story.
2. Expansions for groups: Faithfulness? Taylor? Quadratic?
3. The pure braid group and iterated integrals.
4. Elliptic braid groups and iterated integrals.
5. Virtual braids.
6. w -braids and flying rings.
7. It is all vastly more general: For knotted trivalent graphs, the Kontsevich integral. For w -tangled trivalent graphs, the AT/KV/BF story. The last bit is also why I think there should be more to w -braids.

Abstract: It is insufficiently well known that the good old Taylor expansion has a completely algebraic characterization, which generalizes to arbitrary groups (and even far beyond). Thus one may ask: Does the braid group have a Taylor expansion? (Yes, using iterated integrals and/or associators). Do braids on a torus ("elliptic braids") have Taylor expansions? (Yes, using more sophisticated iterated integrals / associators). Do virtual braids have Taylor expansions? (No, yet for nearby objects the deep answer is Probably Yes). Do groups of flying rings (braid groups one dimension up) have Taylor expansions? (Yes, easily, yet the link to TQFT is yet to be fully explored).

Do?