

HW7 returned. HW8 due. HW9 on web.

Last time: Given \mathfrak{g} , $U\mathfrak{g}: A(\mathfrak{g}) \rightarrow U(\mathfrak{g})$:

A is a "universal universal enveloping algebra"

Today's goals: The bi-algebra structure, tangles

A is an algebra and so is U . Is $A \sim$ bi-algebra?

1. Define algebra $(A, m, \epsilon, \text{diagrams})$
2. Define co-algebra $(C, \Delta, \eta, \text{diagrams})$
3. Define bi-algebra.
4. A is \sim bi-algebra

$$\exists \eta, \square: A \rightarrow A \otimes A \text{ s.t. } \forall v_1, v_2 \in U$$

$$W_{v_1, v_2} = m \circ (W_{v_1} \otimes W_{v_2}) \circ \square_A$$

5. Milnor-Moore & primitives. *not done.*
6. Warning: Given \mathfrak{g}

$$(A, m, \square) \iff (U(\mathfrak{g}), m, \Delta)$$

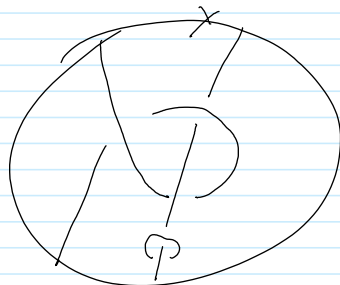
Questions 1. What is Δ in A language?

2. What is \square in $U(\mathfrak{g})$ language?

done line.

Tangles [contain knots]

1. Delete an edge
2. Double an edge
3. Planar algebra



Question What is \mathfrak{g} ? What's "an expansion"?