SOME SURFACE-DIAGRAMMATIC PROOFS

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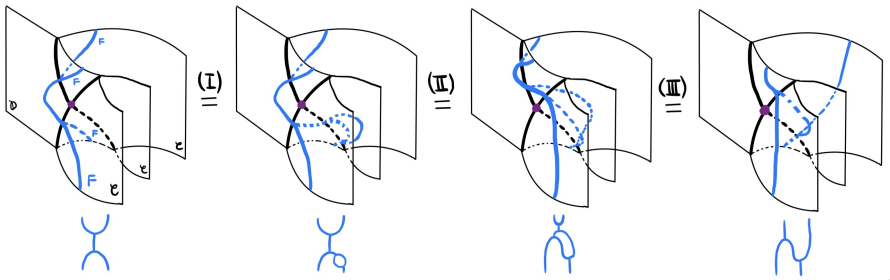
Abstract. This is a collection of surface-diagrammatic proofs that have not made it into my master's thesis.

First up, the next result is mentioned in Remark 2.16. of my master's thesis. Day and Pastro prove the result using commutative diagrams [DP08, Prop. 3].

Proposition 0.0.1. *Let $\mathcal{C}$ and $\mathcal{D}$ be monoidal categories. Any strong monoidal functor $F\colon \mathcal{C} \to \mathcal{D}$ is a Frobenius monoidal functor.*

Proof. We show that $F\colon \mathcal{C} \to \mathcal{D}$ satisfies the Frobenius relation (F1):



Equalities (I) and (III) hold since the monoidal structure on F is strong, while equality (II) follows from the associativity axiom of the (lax) monoidal structure. The proof of Frobenius relation (F2) is obtained from the above proof by reflecting each surface diagram along the side face. □

References

[DP08] Brian Day and Craig Pastro. Note on Frobenius monoidal functors. *New York J. Math.*, 14:733–742, 2008.

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