homotopy addition lemma and corollary

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0.1 Homotopy addition lemma

Let $f : \boldsymbol{\rho}^{\square}(X) \to \mathsf{D}$ be a morphism of ***http://planetmath.org/HomotopyDoubleGroupoidOfAHausdorffSpa*** *groupoids with connection. If $\alpha \in \boldsymbol{\rho}_2^{\square}(X)$ is thin, then $f(\alpha)$ is thin.*

0.1.1 Remarks

The groupoid $\boldsymbol{\rho}_2^{\square}(X)$ employed here is as defined by the `http://planetmath.org/CubicallyThinHomotopycu` thin homotopy on the set $R_2^{\square}(X)$ of `http://planetmath.org/ThinDoubleTracks`squares. Additional explanations of the data, including concepts such as path groupoid and homotopy double groupoid are provided in an `http://planetmath.org/WeakHomotopyAdditionLemma`attachment.

0.2 Corollary

*Let $u : I^3 \to X$ be a singular cube in a Hausdorff space X. Then by restricting u to the faces of I^3 and taking the corresponding elements in $\boldsymbol{\rho}_2^{\square}(X)$, we obtain a cube in $\boldsymbol{\rho}^{\square}(X)$ which is commutative by the Homotopy addition lemma for $\boldsymbol{\rho}^{\square}(X)$ ([**?**], Proposition 5.5). Consequently, if $f : \boldsymbol{\rho}^{\square}(X) \to \mathsf{D}$ is a morphism of* ***http://planetmath.org/HomotopyDoubleGroupoidOfAHausdo*** *groupoids with connections, any singular cube in X determines a* ***http://www.math.purdue.edu/research/a*** *3-shell in D.*

References

[1] R. Brown, K.A. Hardie, K.H. Kamps and T. Porter, A homotopy double groupoid of a Hausdorff space, *Theory and Applications of Categories.* **10**,(2002): 71-93.