Factorization Constraints in Non–Compact Non–Rational Conformal Field Theory

Hendrik Adorf

Gottfried Wilhelm Leibniz Universität Hannover

Outline

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- What is non–compact non–rational CFT?

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- Rôle of sewing constraints in CFT and BCFT $\longrightarrow$ D–branes
- Our results and observations on the factorization constraint in the H_3^+ model
- Conclusions

Motivation and Introduction

Non–Compact Non–Rational CFT...

Rational CFT (RCFT)	Non–Compact Non–Rational CFT

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$\hat{\mathrm{su}}(2)_k$ WZNW model	H_3^+ model (($\hat{\mathrm{sl}}(2,\mathbb{C})_k$ WZNW))
$\downarrow$	$\uparrow$
minimal models	Liouville Theory

... and String Theory

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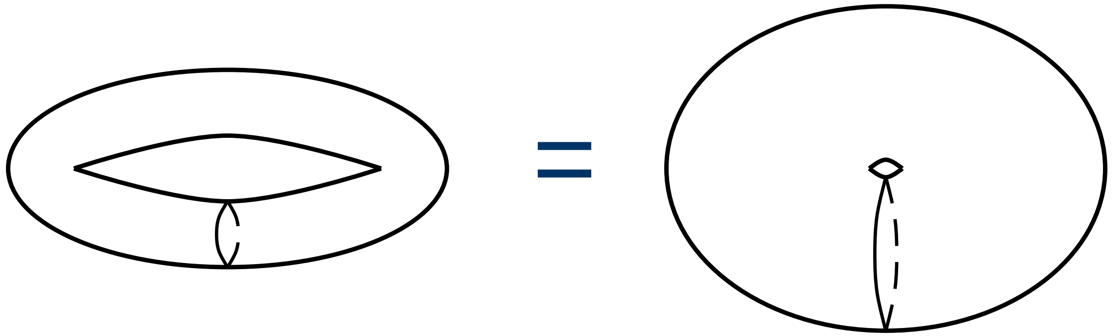
- benefit of AdS_3: $\mathrm{SL}(2,\mathbb{R})$ group manifold $\longrightarrow$ WZNW model
- even nicer: euclidean rotation to $\mathrm{SL}(2,\mathbb{C})/\mathrm{SU}(2) = \mathrm{H}_3^+$

Sewing Constraints and D–Branes

Sewing Constraints in Bulk CFT



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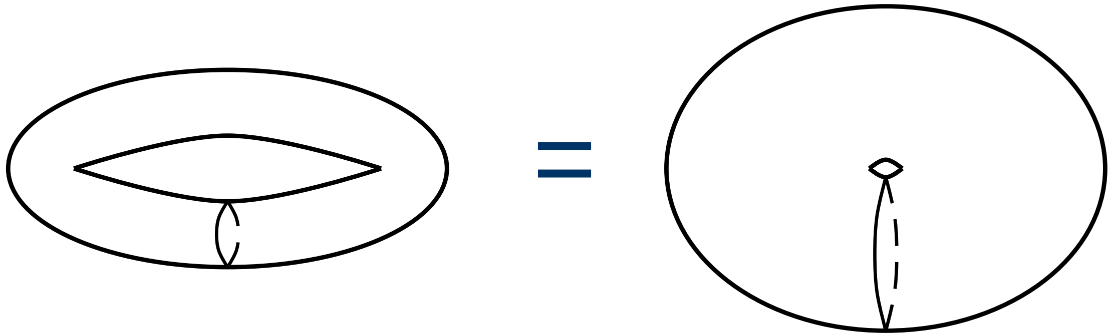

partition function:
modular invariance

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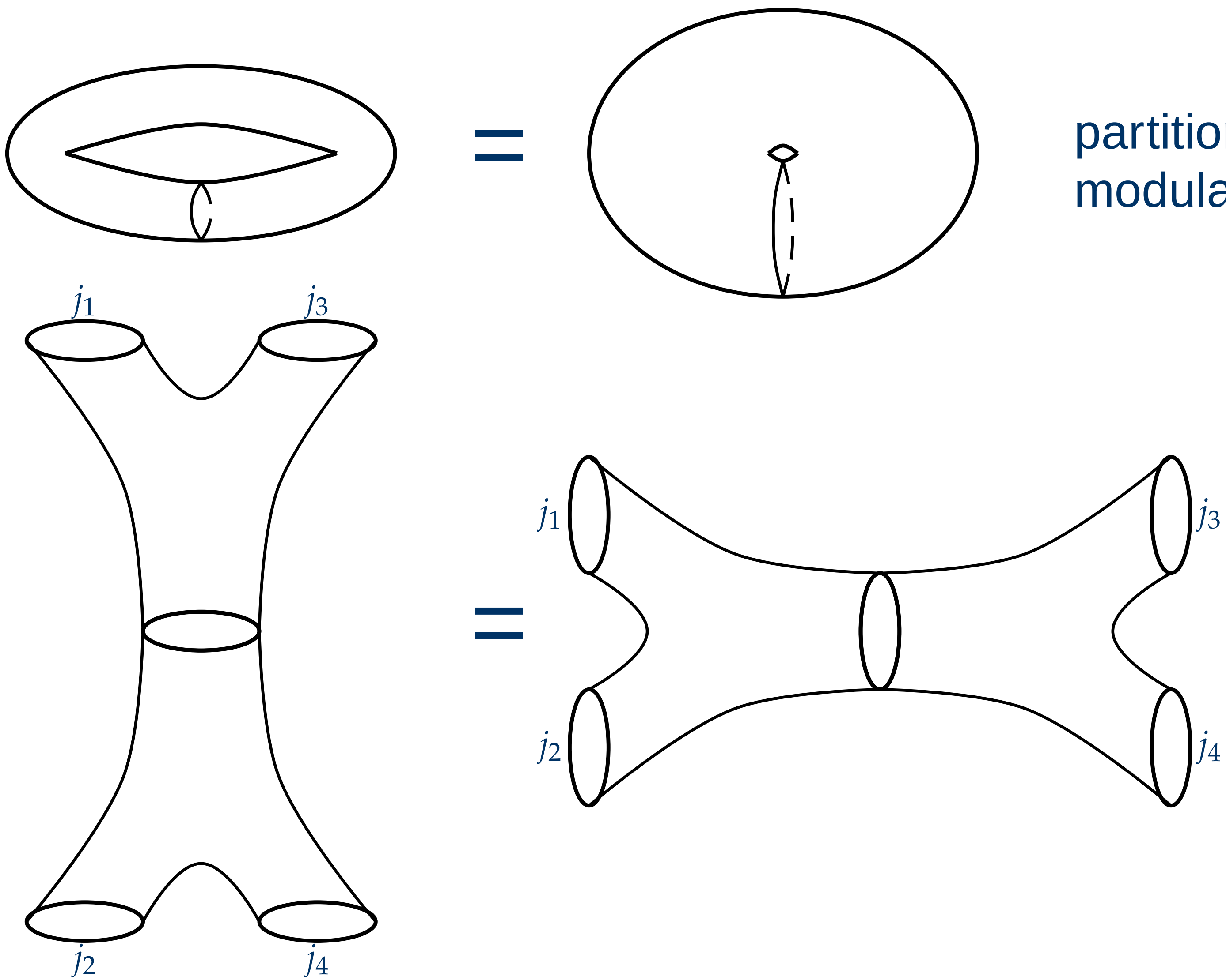

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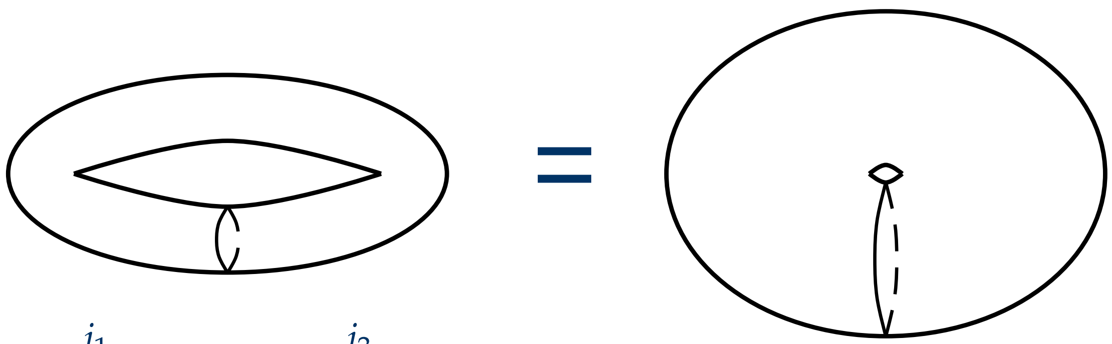

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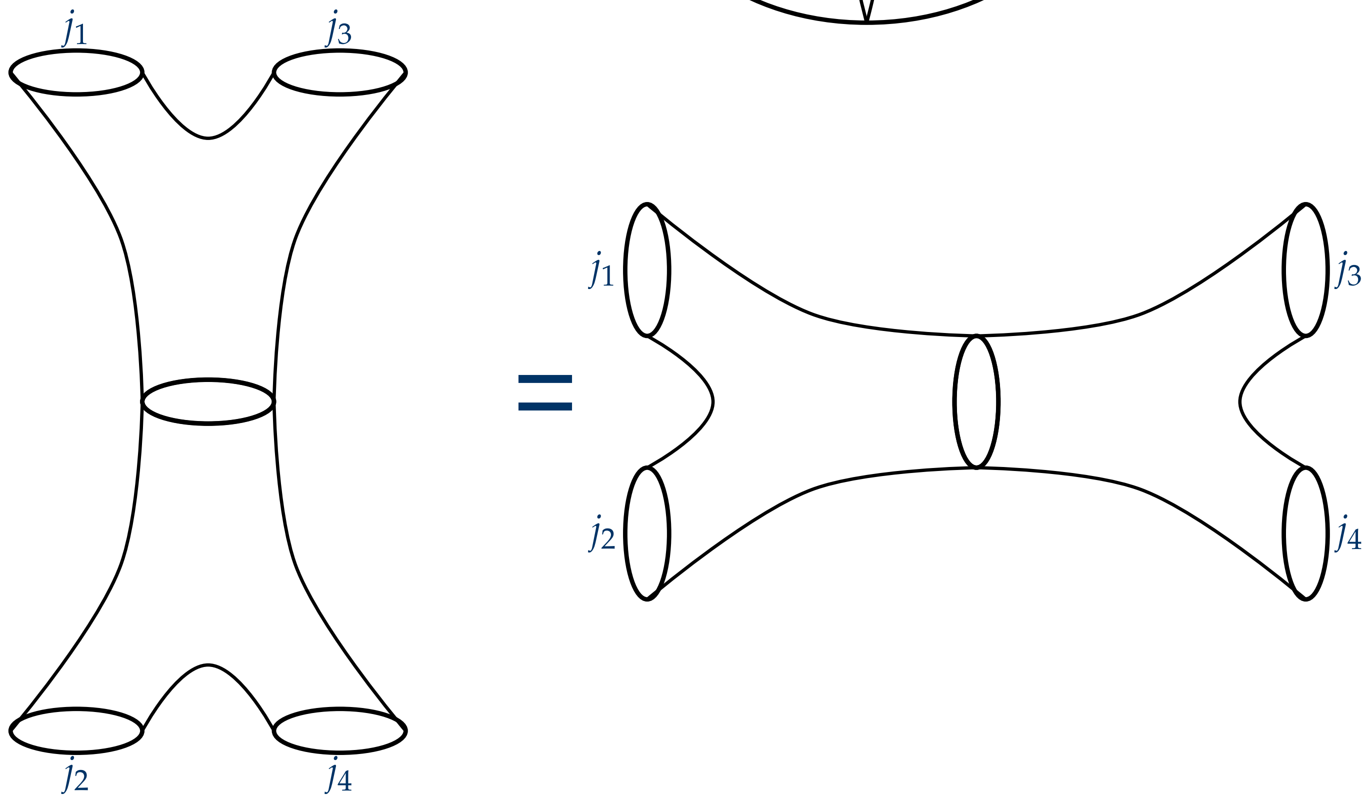

4–pt. function:
crossing symmetry

Sewing Constraints in Boundary CFT

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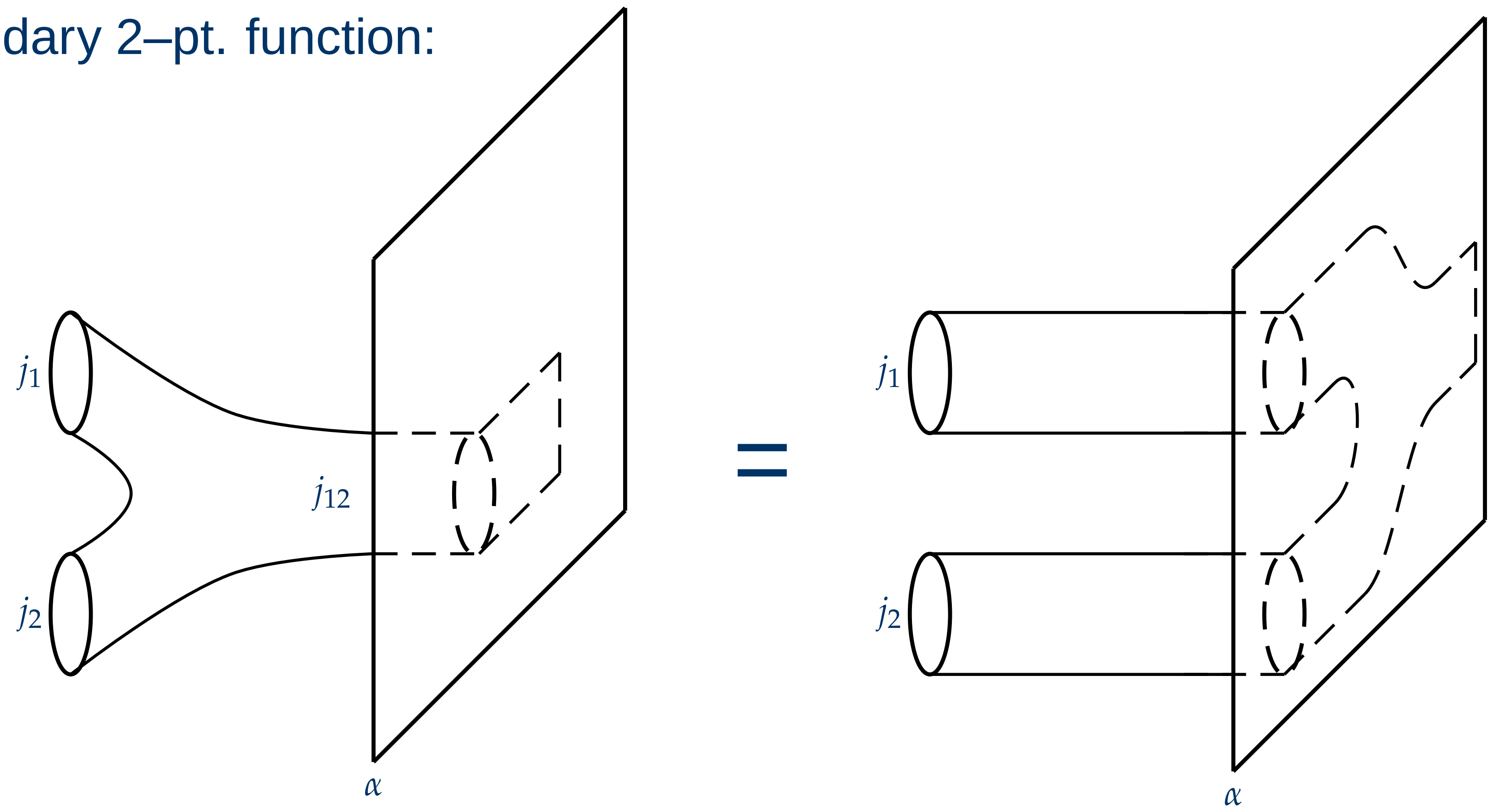
boundary 2–pt. function:



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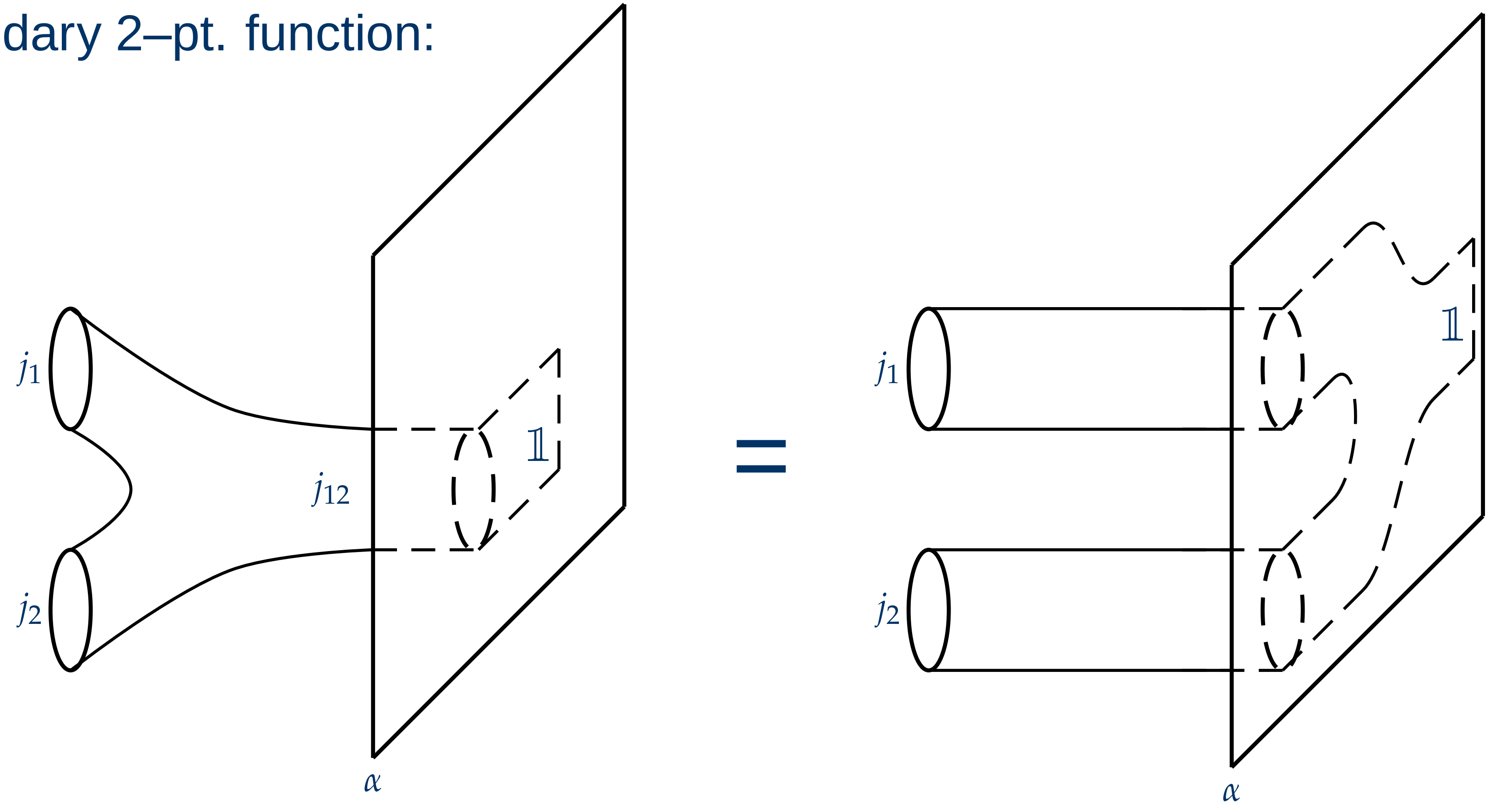

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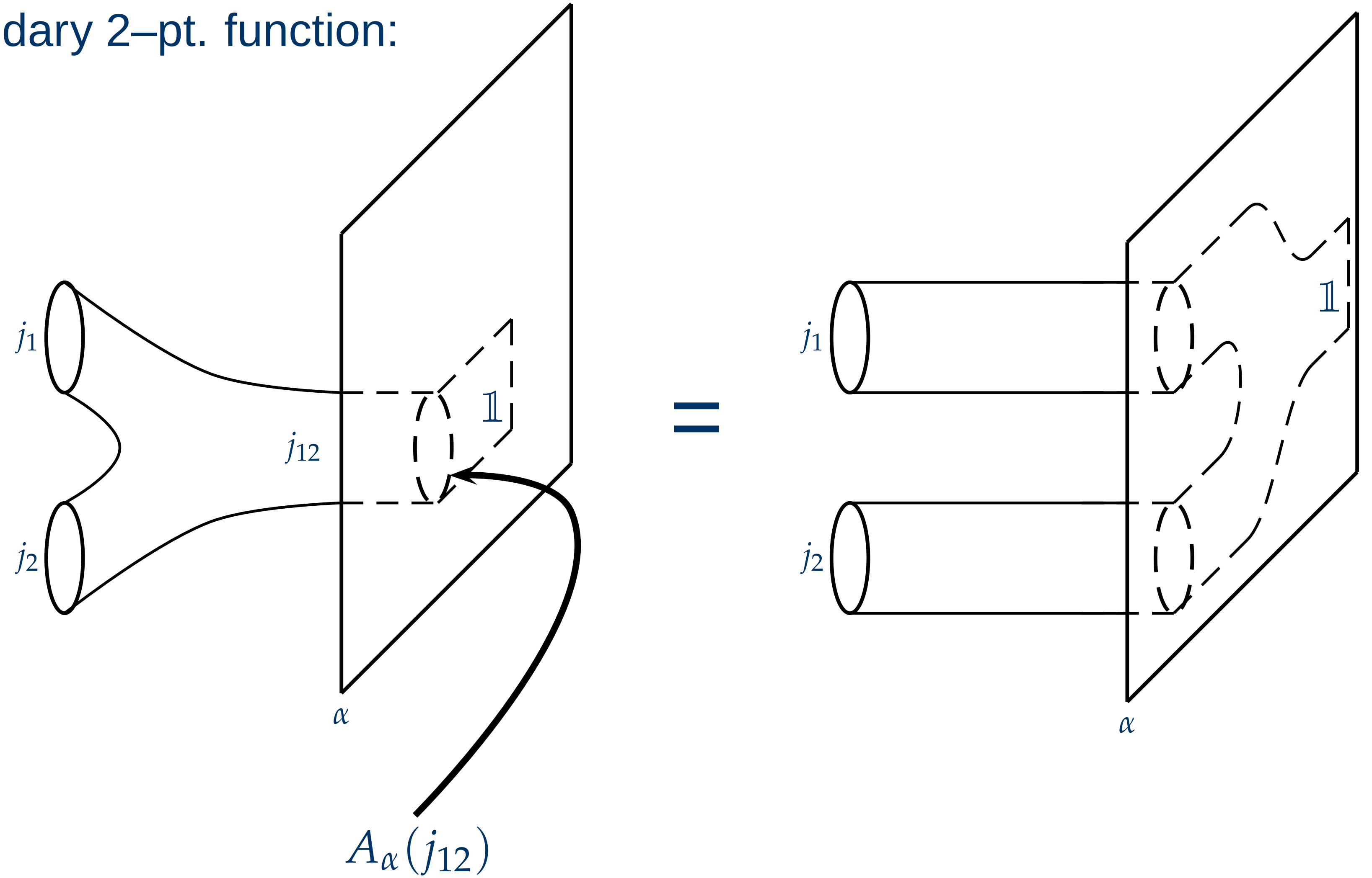

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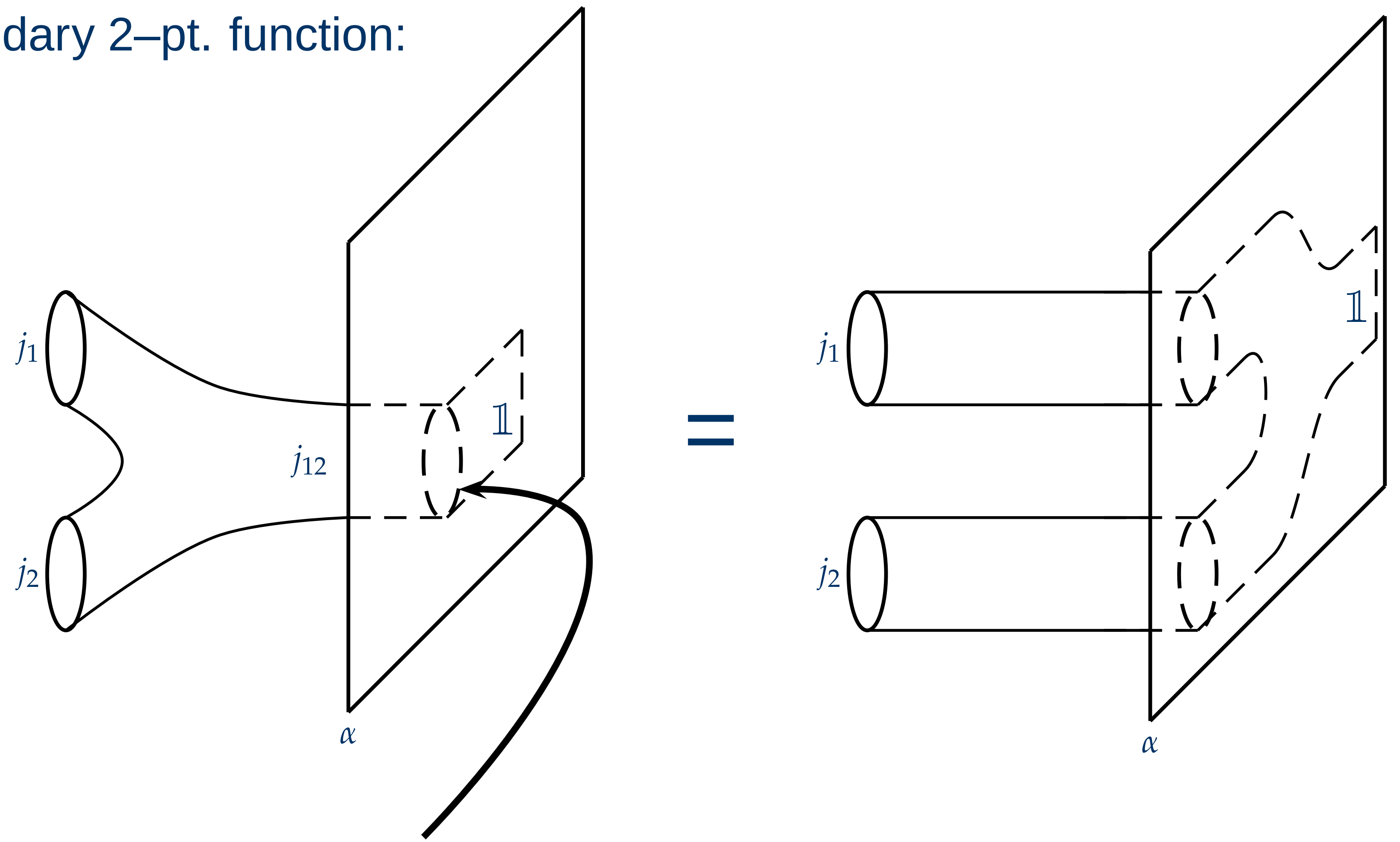

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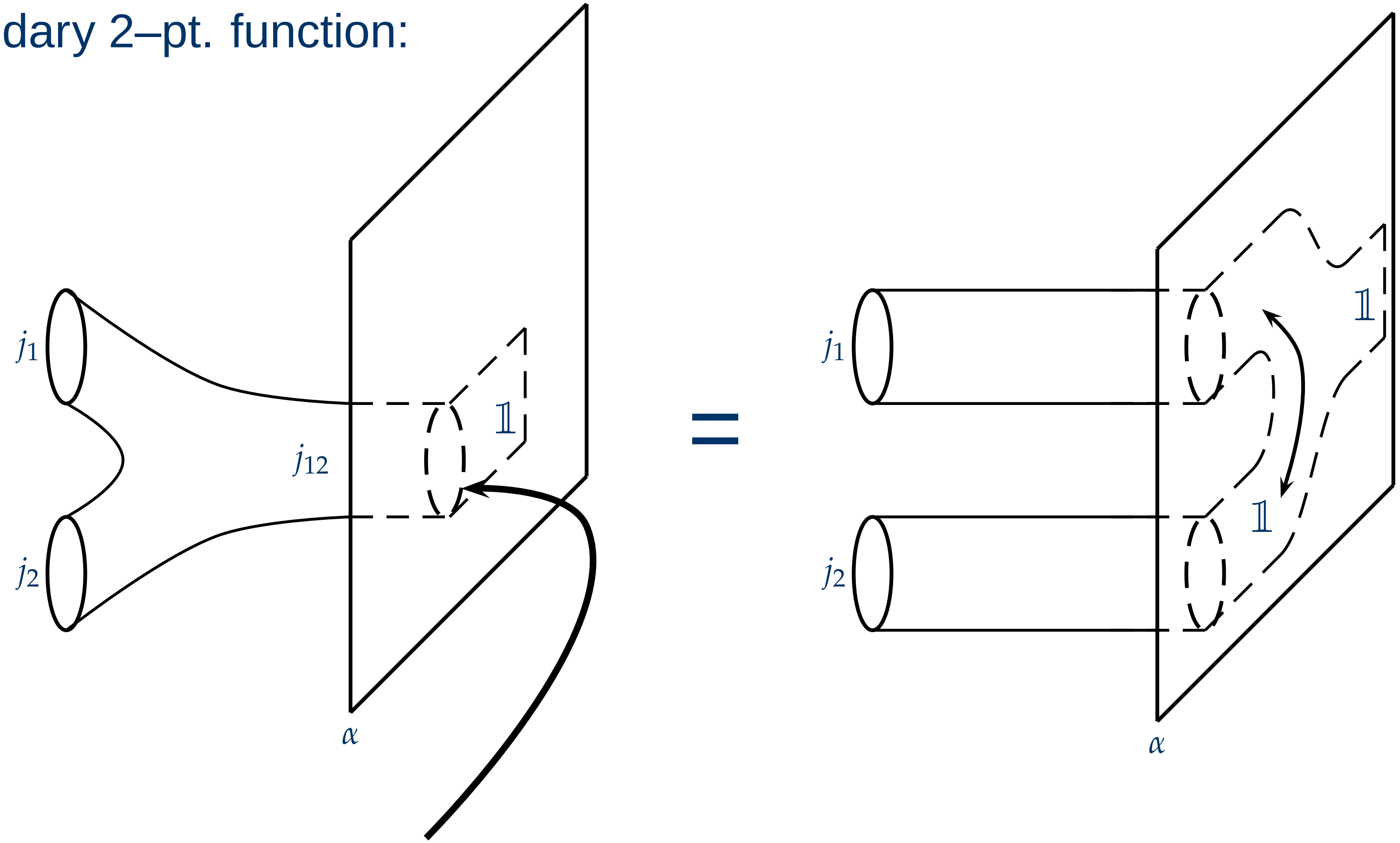

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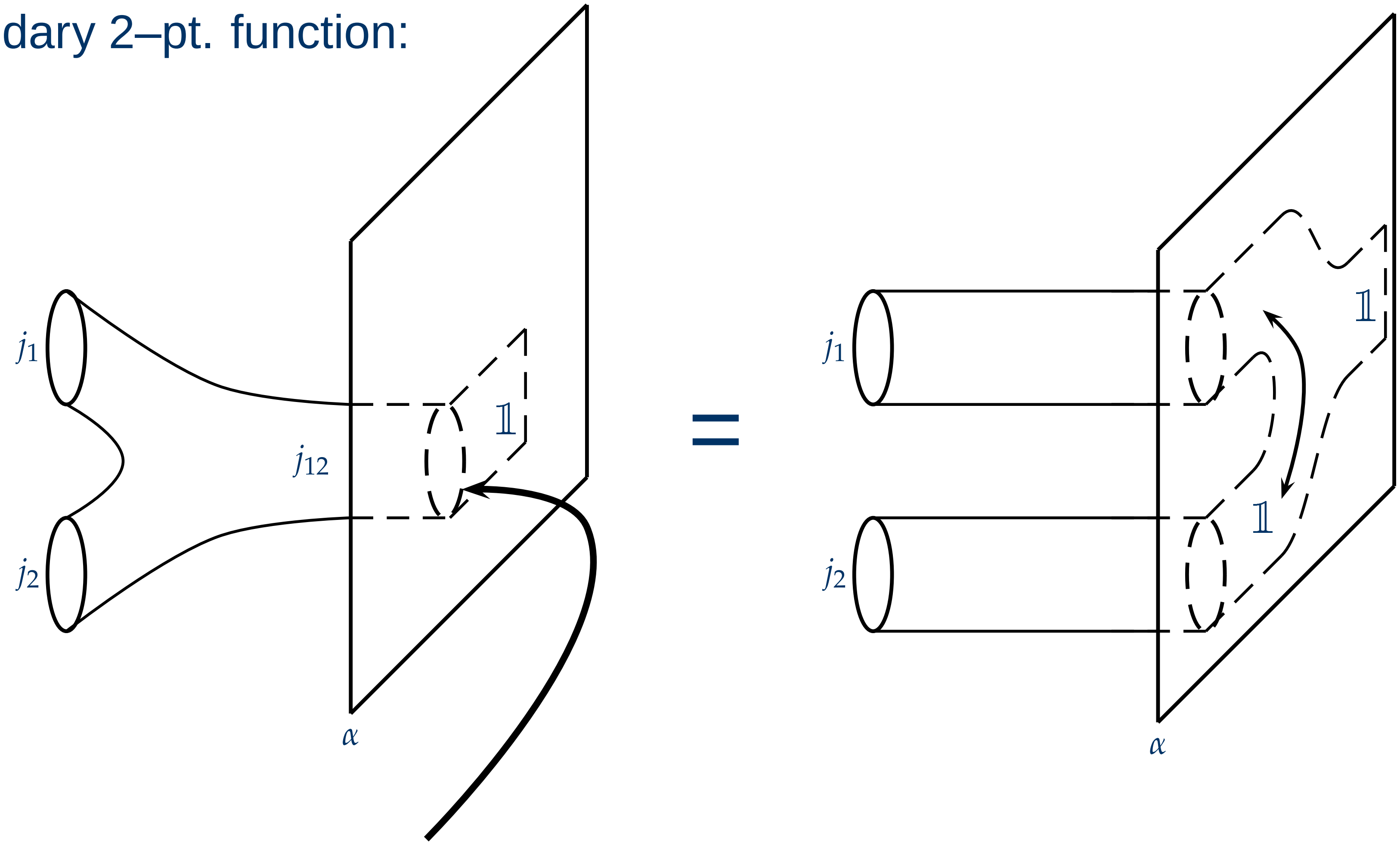

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- goal: another constraint from next simple reducible representation $j' = b^{-2}/2$

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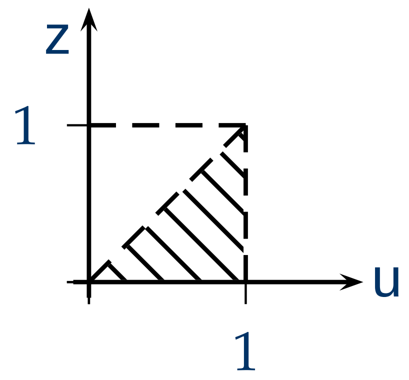

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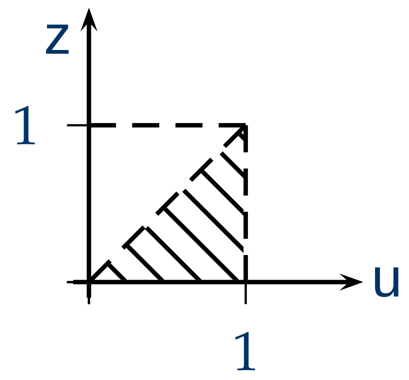

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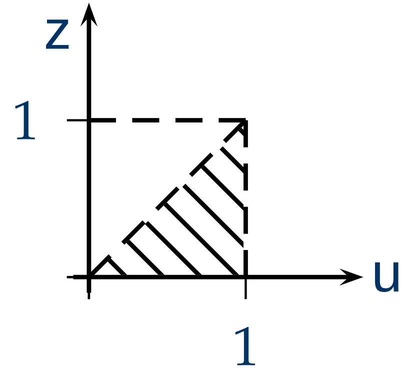

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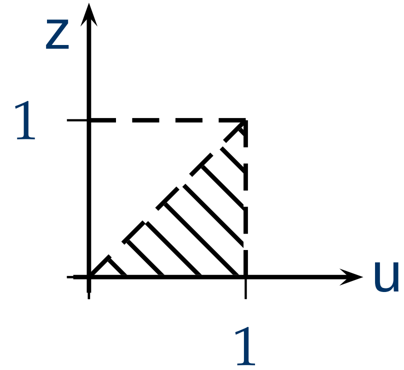

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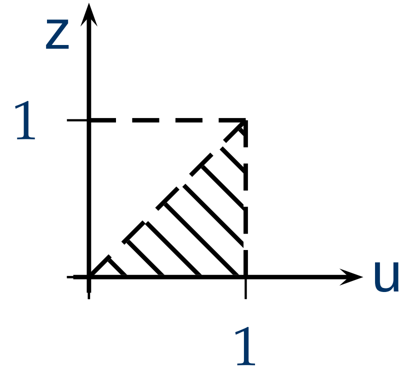

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  - analytic continuation [Giveon,Kutasov,Schwimmer'01],[Adorf,Flohr'08]

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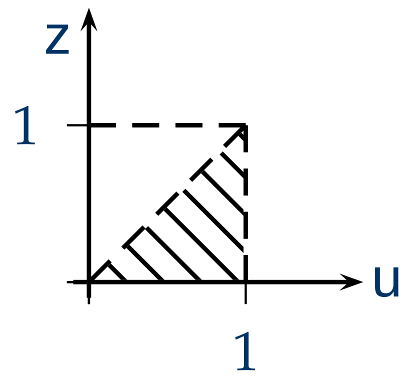

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  - continuity at $u = z$ [Adorf,Flohr'07]

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- Both approaches: meaningful factorization constraint
- Brane spectra coincide
- Analytic continuation slightly more restrictive

Conclusions

Summary

- Non–compact non–rational CFT

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- Non–compact non–rational CFT $\nearrow$ general structure of CFT

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- Non–compact non–rational CFT ↗ general structure of CFT ↘ string theory

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» Summary

» Open Questions

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Summary

- Non–compact non–rational CFT $\nearrow$ general structure of CFT; $\searrow$ string theory $\rightarrow$ AdS spaces; string theory $\nearrow$ Liouville

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- Non–compact non–rational CFT $\searrow$ string theory
  - string theory $\nearrow$ Liouville
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[Adorf,Flohr'07]

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    [Adorf,Flohr'08]

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... based on Hendrik Adorf and Michael Flohr:

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