

2d CFT reading group (Summer 2018)

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Contents

1 CFT on $g = 0$

- Fundamentals. (e.g. *Blumenhagen Ch.2, di Francesco Ch.5,6,7*)
- Basic examples of CFT's on S^2 (free boson, free fermion, ghost). (e.g. *Blumenhagen Ch. 2.9*)
- Crossing symmetry of 4-pt functions on S^2 and the idea of Conformal Bootstrap. (e.g. *Ch.9-10 from [?]*)
- Overview of what is known up to date for Virasoro Conformal Blocks. Zamolodchikov's recursion relations and Monodromy method technique. (e.g *[?] and [?] for up to date status, and Appendices B,C,D,E from [?] for the methods*)
- Simon's inversion formula review and work out a basic example (*Ising model in the appendix of his paper*).
- CFTs with extended symmetry algebra on S^2 (Kac-Moody, Sugawara construction, WZW models). (e.g. *Blumenhagen Ch.3, di Francesco Ch.15*)
- Liouville Theory on S^2 . (e.g. *[?]*, or *Ch.3 from [?]*)

2 CFT on $g = 1$

- Fundamentals. (e.g. *Blumenhagen Ch.4 or di Francesco Ch.10*)
- Basic examples of CFT's on $g = 1$ (free boson, free fermion). (e.g *di Francesco Ch. 10.2-10.3*)
- Orbifold CFT's. (e.g. *Blumenhagen Ch. 4.2.5*)
- Universal results we know from Modular Invariance and Modular Bootstrap (*Basic examples: (i) Cardy formula, (ii) HKS paper (ii) Alex's formula, (iii) Hellerman, from the known papers*).

- CFTs with extended symmetry algebra on $g = 1$ (just the basics, how it differs from S^2). (e.g. *di Francesco Ch. 17.1*)
- Chiral CFT's (e.g. *Appendix A from [?]*)

3 General

- c-theorem. (e.g. [?])
- Basics of Entanglement and Renyi Entropies in 2d CFTs. (e.g. [?],[?])
- Basics of SUSY 2d CFT's. (e.g. *Blumenhagen Ch.5*)
- The example of D1-D5 system. (e.g. *Hartman's lectures Ch. 11-12-13 or [?]*)

4 Other (maybe..)

- Vertex Operator Algebras. (*paper by Gaberdiel from 2005*)
- Integrable deformations of 2d CFTs. (*papers by Zamolodchikov, Cardy*)
- 2d CFT's with gravitational anomalies. (*paper by A.Castro and E.Perlmutter*)
- Extremal CFT's and Moonshine relations. (*Sarah, Miranda Cheng papers*)
- 2d Yang-Mills (e.g. *from [?]*)

References

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- [2] E. Perlmutter, *Virasoro conformal blocks in closed form*, arXiv:1502.07742
- [3] Y. Kusuki, *New Properties of Large-c Conformal Blocks from Recursion Relation*, arXiv:1804.06171
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- [5] A. B. Zamolodchikov and A. B. Zamolodchikov, *Structure constants and conformal bootstrap in Liouville field theory*, Nucl.Phys. B477 (1996) 577-605
- [6] P. Ginsparg, G. Moore, *Lectures on 2D Gravity and 2D String Theory*, hep-th/9304011
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- [9] P. Calabrese, J. Cardy, *Entanglement entropy and conformal field theory*, arXiv:0905.4013
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- [11] N. Seiberg, E. Witten *The D1/D5 System And Singular CFT*, hep-th/9903224
- [12] S. Cordes, G. Moore, S. Ramgoolam *Lectures on 2D Yang-Mills Theory, Equivariant Cohomology and Topological Field Theories*, hep-th/9411210