SEMPARIS – Séminaires en région parisienne

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Cours

Vendredi 5 Avril 2024, 10 :00
IPHT, Salle Claude Itzykson, Bât. 774
Domaines : physics

Titre : *Exactly solvable 2D conformal field theories*

Orateur : **Sylvain Ribault (IPhT)**

Résumé : *Abstract : In this course, we review two-dimensional CFT in the bootstrap approach, and sketch the known exactly solvable CFTs with no extended chiral symmetry : Liouville theory, (generalized) minimal models, limits thereof, and loop models, including the O(n), Potts and U(n) models.*
Exact solvability relies on local conformal symmetry, and on the existence of degenerate fields : we explain how these assumptions constrain the spectrum and correlation functions. We discuss the crossing symmetry equations, and how they can be solved analytically or numerically, leading to analytic formulas for structure constants.

In the case of loop models, we review the combinatorial description of correlation functions, inspired by the lattice construction of statistical models. We sketch what remains to be done for solving the models.

The plan is :
1. The Virasoro algebra and its representations. Fields and operator product expansions.
2. Fusion rules and fusion products. Correlation functions and Ward identities. Crossing symmetry and conformal blocks.
3. Defining a CFT. Diagonal and non-diagonal fields, degenerate fields. Exactly solvable CFTs and their spectrums.
4. Degenerate 4-point functions. Analytic formulas for 2-point and 3-point structure constants._ 5. Computing conformal blocks. Numerical bootstrap.
6. Correlation functions in loop models.

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