

Multivariable Power Series  
 Reversion and Lagrange-Good  
 Inversion via Quantum Field  
 Theory

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What is quantum field theory, really?

→ a generalization of calculus!

I - A game of symbolic integration

1) Composition

2) Reversion

3) Lagrange-Good Inversion

II - Feynman Diagrams: Like M. Jourdain  
physicists have been computing with  
combinatorial species without knowing.

# I. A Game of Symbolic Integration:

3

$K$  commutative field.

$F \in K[[X_1, \dots, X_n]] \Leftrightarrow$  function  $K^n \rightarrow K$

$F = (F_i)_{1 \leq i \leq n}$ ,  $F_i \in K[[X_1, \dots, X_n]] \Leftrightarrow$  function  $K^n \rightarrow K^n$

$u$  collection of variables  $u_1, \dots, u_n$   
 $du = du_1 \dots du_n$

$$u \cdot v = u_1 v_1 + \dots + u_n v_n$$

Rule 1:  $\int du F(u) \delta(u) = F(0)$

Rule 2:  $\int du e^{-uv} = \delta(v)$

Rule 3: All rules of calculus allowed:

Integration by parts, Fubini, change of variables (no 1.1 for Jacobian) ...

