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A Comment on the Local Existence of the Borel Transform in Euclidean Φ_4^4

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In [1] we proved the convergence of the Borel transformed perturbation series in euclidean Φ_4^4 field theory. Though our result is valid, one of our lemmas does not exhibit all the needed information, and must be corrected. Lemma III-4 in [1] has to be modified as follows:

Suppress Proposition a) *of Lemma III-4, and after Eq.* (III-25), *replace the second line of Proposition* d) *by:*

$P_m = V^{\mathscr{K}_m}_{\mathscr{I}_m \bar{\mathscr{I}}_m}$ for $v(\delta)$ values of m, with $v(\delta) \leqq f(\mathscr{F} \cup \mathscr{H})$, and the indices δ satisfying $v(\delta) = v$ run over a set of at most $4^{f(\mathscr{F}\cup\mathscr{H})} \dfrac{[f(\mathscr{F}\cup\mathscr{H}) - v]!}{s!}$ elements.

This new version of Lemma III-4 is again proved by inspection of Eqs. (III-28)–(III-31). With these modifications, Eq. (III-35) has to be replaced by:

$$|I^{\mathscr{F}}_{G,\sigma}| \leqq \int_0^1 \dots \int_0^1 \prod_{i=1}^{l-1} \beta_i^{i-1} d\beta_i \left| \sum_{v=1}^{f(\mathscr{F}\cup\mathscr{H})} \sum_{\substack{\delta \\ v(\delta)=v}} Y^{\delta}_G(p,\beta_i) \cdot \Gamma(\omega^R(G) + v(\delta)) \right| .$$

By noting that $\Gamma(\omega^R(G) + v(\delta)) \leqq \Gamma(\omega^R(G))\,[v(\delta)]!\,K^n$ and

$$[f(\mathscr{F}\cup\mathscr{H}) - v]!\,v! \leqq [f(\mathscr{F}\cup\mathscr{H})]!\,,$$

the corrected formulation of Lemma III-4 leads to the same conclusions as before, and proves Theorem I of [1].

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Reference

1. de Calan, C., Rivasseau, V.: Local existence of the Borel transform in euclidean Φ_4^4. Commun. Math. Phys. **82**, 69–100 (1981)

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