Problems in

QUANTUM FIELD THEORY

With Fully-Worked Solutions

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ERRATA

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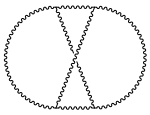
1. In the left hand side of the last equation in the solution of this problem, a subscript "I" is missing on the derivative of the Lagrangian, tho indicate that only the interaction part of the Lagrangian should appear here. The LHS of this equation should therefore read

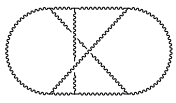
$$(\Box + m^2)\phi(x) - \mathcal{L}_I'(\phi(x)).$$

Alternatively, one may replace $-\mathcal{L}_{\text{int}}'$ by $+V'$. Credit: typo found by KRZYSZTOF KUTAK.

42. The order of the last of the three-loop examples in (3.47) is incorrectly stated. Its correct power counting reads


$\sim \mathcal{O}((g^2N)^2N^2)$.

(This graph can still be embedded on the surface of a sphere.) If one wants to include in the statement of the problem an example that belongs to a different topological class, one may consider the following 4-loop graph


$\sim \mathcal{O}((g^2N)^3N^0)$.

In the solution, the first sentence of **42.b** should read: Interestingly, all the examples listed in (3.47) are of the form $(g^2N)^pN^2$, while the above 4-loop example is of the form $(g^2N)^pN^0$.

The last sentence of **42.d** should read: In the above examples, one may check that all the graphs of order $(g^2N)^pN^2$ can be embedded on the surface of a 2-sphere, while the example of order $(g^2N)^pN^0$ requires a torus with one hole.

Email me at francois.gelis@ipht.fr if you discover mistakes not yet listed here.
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