Klassische Physik 1 Hausaufgaben Blatt Nr. 0
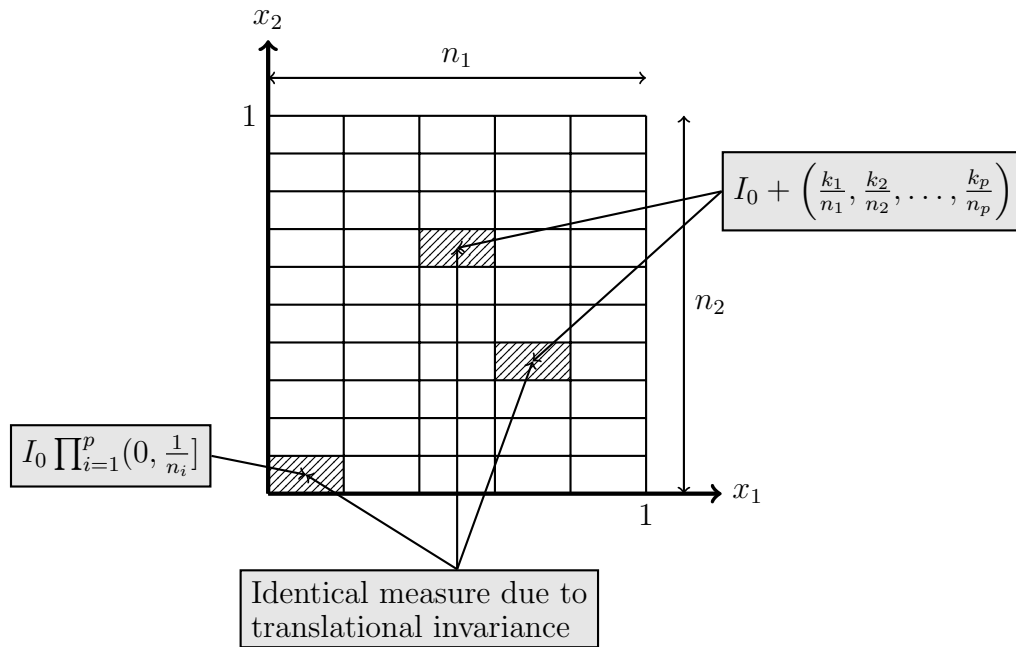
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Theorem 1. *The Lebesgue Measure is the only translationally invariant measure on $\mathfrak{L}^p$ that satisfies the normalisation condition $\mu((0,1]^p) = 1$.*

Proof. Let $n_1, n_2, \ldots n_p \in \mathbb{N}$. Then

Hence the Lebesgue Measure λ and the new measure μ agree on all intervals of the form $\prod_{i=1}^{p} \left(0, \frac{1}{n_i}\right]$. The conclusion follows. $\square$

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