Klassische Physik 1 Hausaufgaben Blatt Nr. 0
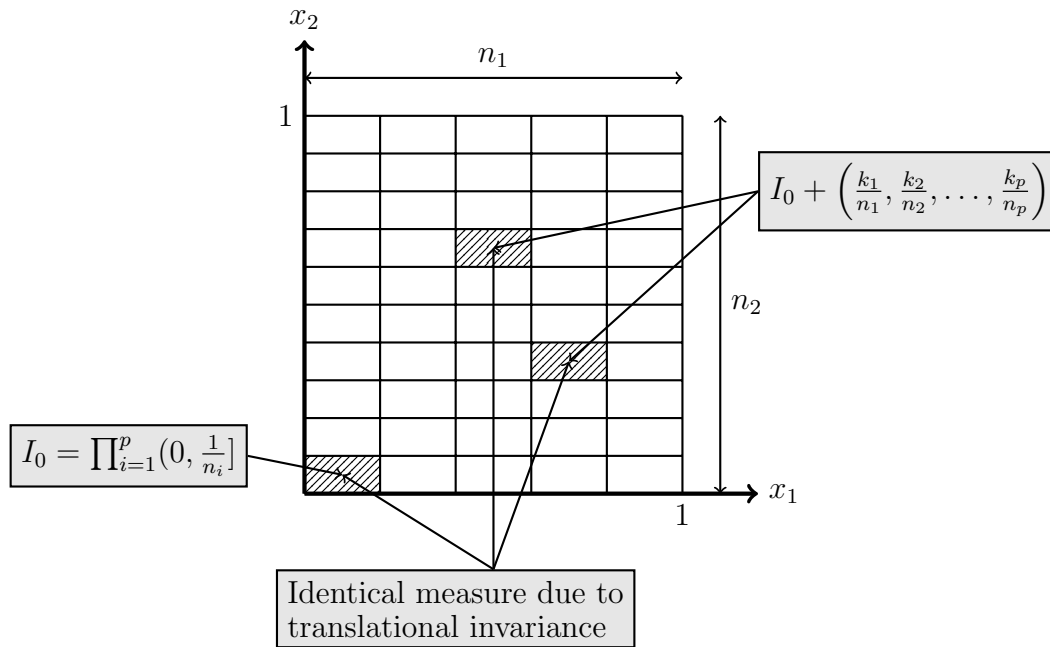
Jun Wei Tan,[*] Saed Othman, and Mattis Liebermann

Julius-Maximilians-Universität Würzburg

(Dated: October 28, 2023)

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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[*] jun-wei.tan@stud-mail.uni-wuerzburg.de