

Financial Mathematics

More integration theorems

2450-1. Let $I := [0, 1]$ be the closed interval from 0 to 1.

Let λ_1 denote the restriction, to I , of Lebesgue measure on \mathbb{R} .

Find a function $f : I \times I \rightarrow \mathbb{R}$

$$\text{s.t.}, \forall y \in [0, 1], \int_I f(x, y) d\lambda_1(x) = 0,$$

$$\text{s.t.}, \forall x \in [0, 1/4], \int_I f(x, y) d\lambda_1(y) = 3,$$

$$\text{and s.t.}, \forall x \in (1/4, 1], \int_I f(x, y) d\lambda_1(y) = 0.$$

Note that Fubini fails.