A NONLOCAL OPTIMAL PARTITION PROBLEM

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Abstract. We prove an existence result for an optimal partition problem of the form

$$\min\{F_s(A_1,\dots,A_m)\colon A_i\in\mathcal{A}_s,\ A_i\cap A_j=\emptyset \text{ for } i\neq j\},$$

where F_s is a cost functional with suitable assumptions of monotonicity and lower semicontinuity, $\mathcal{A}_s$ is the class of admissible domains and the condition $A_i\cap A_j=\emptyset$ is understood in the sense of Gagliardo s-capacity, where $0<s<1$. Examples of this type of problem are related to fractional eigenvalues. We also demonstrate some type of convergence of the s-minimizers to the minimizer of the problem with $s=1$, studied in *Existence results for some optimal partition problems*, Bucur-Buttazzo-Henrot, 1998.

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