



Seminari di Matematica

The regularity of solutions for a class of Elliptic systems

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Abstract

In this talk, we will be interested in the regularity of solutions for elliptic systems of Maxwell-Schrödinger type:

$$\begin{cases} -\operatorname{div}(M(x)\nabla u) + h(x, u, v) = f & \text{in } \Omega; \\ -\operatorname{div}(M(x)\nabla v) = g(x, u, v) & \text{in } \Omega; \\ u = v = 0 \text{ on } \partial\Omega. \end{cases} \quad (\text{P})$$

Following the seminal works of L. Boccardo and L. Orsina, cf. [1, 2], we are going to explore under which conditions on h and g , solutions stay in improved zones of regularity, see [3]. As it turned out, there are regions where the solutions are more regular than what is guaranteed by the well-known sharp results for the decoupled version of our system. This is the so-called Regularizing Effect, cf. [1, 2]. We also would like to discuss a nonlocal version of (P).

References

- [1] L. BOCCARDO, *Elliptic systems of Schrödinger type in the spirit of Benci-Fortunato*, Adv. Nonlinear Stud. 15 (2015) pp. 321–331.
- [2] L. BOCCARDO AND L. ORSINA, *Regularizing effect for a system of Schrödinger–Maxwell equations*, Adv. Calc. Var., 11.1 (2016), 75–87.
- [3] A. P. DE CASTRO SANTANA AND L.H. DE MIRANDA, *Regularizing effect for a class of Maxwell–Schrödinger systems*, Nonlinear Analysis 248 (2024) 113625,
- [4] A. P. DE CASTRO SANTANA AND L.H. DE MIRANDA, *Regularizing Effect for a Nonlocal Maxwell–Schrödinger System*, Submitted (2025).

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