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**A quasi-linear heat transmission problem in a periodic dilute two-phase composite**

**Abstract**

We consider a temperature transmission problem for a composite material which fills the Euclidean space. The composite has a periodic structure and consists of two materials. In each periodicity cell one material occupies an inclusion of size  $\epsilon$ , and the second material fills the remaining part of the cell. We assume that the thermal conductivities of the materials depend nonlinearly upon the temperature. We show that for  $\epsilon$  small enough the problem has a solution, *i.e.*, a pair of functions which determine the temperature distribution in the two materials. Then we show that under suitable assumptions, such a solution is locally unique, and we analyze its behavior as  $\epsilon$  approaches 0. Joint work with Paolo Musolino.