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Bounds on the volume fractions of two materials in a three dimensional body from boundary measurements by the translation method

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Using the translation method of Tartar, Murat, Lurie, and Cherkaev bounds are derived on the volume occupied by an inclusion in a three-dimensional conducting body. They assume electrical impedance tomography measurements have been made for three sets of pairs of current flux and voltage measurements around the boundary. Additionally the conductivity of the inclusion and surrounding medium are assumed to be known. If the boundary data (Dirichlet or Neumann) is special, i.e. such that the fields inside the body would be uniform were the body homogeneous, then the bounds reduce to those of Milton and thus when the volume fraction is small to those of Capdeboscq and Vogelius.

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