

# The Method for Detection the Surface of Activity Discontinues in Positron Emission Tomography

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**Abstract:** This work is devoted to the question of applicability of the indicator of inhomogeneity to the problem of determining the boundaries of the unknown activity sources in positron emission tomography. Indicator of inhomogeneity was introduced by D.S. Anikonov for finding the boundaries of inclusions that make up inhomogeneous medium in the framework of transmission tomography. It is an integro-differential operator acting on the function describing outgoing radiation, which defined on boundary of the studied area. The result is a function defined on the whole domain, which is finite in each of the inclusions and increases unboundedly as we approach the boundary of the inhomogeneity. In positron emission tomography heterogeneity generated by unevenness of spatial distribution of sources of activity.

Although the method based on the use of the indicator can restore a heterogeneity boundary irregularities, not the values of the corresponding physical quantities in its application have a number of advantages. Firstly, this method presupposes the use of 3D data, which allows much faster to accumulate information. Another positive aspect associated with the fact that the application of indicator of inhomogeneity does not require any information about a medium (knowing the coefficient of attenuation, etc.), it suffices to know only radiation leaving the medium. Furthermore, the use of indicator of inhomogeneity does not require scattering filtration, which is also an important factor.

The use of indicator of inhomogeneity will determine the localization of physiological accumulation imposed pharmaceuticals. In addition, this method can be used to assess the validity of the data obtained by classical methods developed in PET.

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