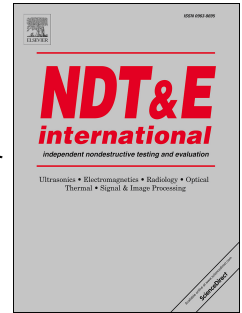


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Theoretical Study of a Simplified Implementation Model of a Dual-Energy Technique for Computed Tomography

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Abstract

The article describes a theoretical study of the simplified implementation of dual energy technique (DET) for computed tomography (CT). The implementation is based on the X-ray pre-filter. Two sets of projections, acquired for two maximal X-ray energies, are transformed to the projections of DET parameters. The density and effective atomic number of the test object fragments are estimated after a separate recovery of the internal structure of the test object for each of the DET parameters. The choice of pre-filter thickness is discussed. An example of the initial projections simulation and the estimation of the internal structure of cylindrical objects are shown.

Keywords: X-ray radiation, dual energy technique, computed tomography, pre-filter X-ray tube

1. Introduction

The dual energy technique (DET) was originally developed for the CT to compensate the X-ray beam hardening in case an attenuating object thickness increases [1, 2, 3]. DET is based on a representation of mass attenuation coefficient (MAC) by a sum of members consisted of two multiplicative components.

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