1. Introduction

Green's functions play an important role in solving boundary value problems in linear elasticity and many engineering problems. For two-dimensional (2D) linear anisotropic elasticity, Green's functions for several different problems such as infinite space, half-space, bi-materials, infinite space with holes, cracks or inclusions, have been obtained analytically (Ting, 1996; Hwu, 2010). Due to the complexity of the mathematical formulation for three-dimensional (3D) linear anisotropic elasticity, relatively few Green's functions can be found in the literature (Ting, 1996; Wu, 1998; 2000). Till now, an accurate and efficient calculation of the Green's function and its derivatives for 3D anisotropic solids is still an important and demanding issue in the anisotropic elasticity and boundary element method (BEM), although Wilson and Cruse (1978) proposed a calculation method for the Green's functions from pre-constructed bivariate cubic spline approximations many years ago. A comprehensive review and very detailed descriptions on several efficient methods for the derivation of the anisotropic Green's functions in infinite, semi-infinite and bi-material spaces and their applications can be found in a recently published excellent monograph by Pan and Chen (2015) and many references cited therein.

Generally, the solutions of the Green's function and its derivatives for 3D anisotropic solids presented in the literature can be categorized into five different forms: (1) line integrals on the oblique plane with normal coincident with the position vector, (2) line integrals on the vertical (or horizontal) plane, (3) expressions in terms of Stroh's eigenvalues, (4) expressions in terms of Stroh's eigenvectors, and (5) expressions in terms of an approximated series expansion.

Around a century ago, Green's function for 3D anisotropic solids was obtained by using Fourier transform (Fredholm, 1900; Lifshitz and Rozenzweig, 1947) and expressed in terms of a line integral on the oblique plane. Following this result, a simple scheme for the derivatives of the Green's function was derived by Barnett (1972) and Mura (1987). Wang (1997) obtained the integral expression by using Radon transform. Using 2D Radon transform, Green's function in terms of a line integral on the vertical or horizontal plane was obtained by Wu (1998) and later re-examined by Buroni and Denda (2014). Here, 2D Radon transform considers only the transformation between two variables and keeps the third variable unchanged. No matter the Radon transform is performed by three variables or two