Abstracts

New View on an Anisotropic Medium and Its Application to Transformation from Anisotropic to Isotropic Problems

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The metric factor is defined as m(epsilon*/sub x/, epsilon*/sub y/, theta/sub x/) = /spl radic/ cos²theta/sub x/ / epsilon*/sub x/ + sin²theta/sub x/ / epsilon*/sub y/ in the radial direction, with the angle theta/sub x/ from the x axis being one of the principal axes in an anisotropic dielectric medium filling the two-dimensional space. The normalized metric factor is defined as n(epsilon*/sub x/, epsilon*/sub y/, theta/sub x/, beta) /spl equiv/ m(epsilon*/sub x/, epsilon*/sub y/, theta/sub x/) / m(epsilon*/sub x/, epsilon*/sub y/, beta) in the form normalized by the metric factor in the direction with the angle beta from the x axis. The effective path length d'/sub P1P2/ between the points P1 and P2 is defined as d'/sub P1P2/ = n(epsilon*/sub x/, epsilon*/sub y/, theta/sub x/, beta)d/sub P1P2/ where d/sub P1P2/ is the actual path length of the straight line P1P2 with the angle theta/sub x/ from the x axis. We propose the minimun principle of the effective path length for electric flux in the region with multilayered anisotropic media. It is applied to solving the electrostatic problem with two anisotropic media whose principal axes are different. We show by using the normalized metric factor that the anisotropic problem can be transformed into the isotropic problem.

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