derivation for the potential of a point charge above thin layer of uniform dielectric above an anisotropic substrate bulk material

using the furrier transform

apply boundary conditions as and as

applying the conditions ,

and ,

(2)

(1)+(5)

(1)-(5)

(4)

(8)+(3)

(3)-(8)

sub (9) in to (6)

sub (10) in to (7)

sub (11) in to (12)

if and the results with out the film are reproduced

sub (13) into let

potential in bulk liquid for a point charge

check trivial cases

h->infty (bulk should disappear)

h=0 (film should disappear)

make half space anisotropic

(should have boundary at h)

looking at a system for a dipole above an anisotropic surface with a thin layer above

taking the dipole to be comprised of 2 point charges with potentials

particle 1:

particle 2:

using the superposition principle

where is the angle of the particle to the normal and is the angel between and

using Taylor expansion at d=0, terms and higher can be ignored

therefore

if and

returns the result for when there is no layer above the anisotropic surface