

Abstract Submitted
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Electromechanics: An analytic solution for graded biological cell.¹

KIN LOK CHAN, K. W. YU, The Chinese University of Hong Kong — Electromechanics of graded material has been established recently to study the effective response of inhomogeneous graded spherical particles under an external ac electric field.[1, 2]Such particles having a complex dielectric profile varies along the radius of the particles. The gradation in the colloidal particles is modeled by assuming both the dielectric and conductivity vary along the radius. More precisely, both the dielectric and conductivity function are assumed to be a isotopic linear function dependence on the radius variable r , namely, $\varepsilon(r) = \varepsilon(0) + A_1 r$, $\sigma(r) = \sigma(0) + A_2 r$. In this talk, we will present the exact analytical solutions of the dipole moment of such particle in terms of the hypergeometric functions, and the effective electric response in dilute limit. Moreover, we applied the dielectric dispersion spectral representation (DDSR) to study the Debye Behavior of the cell. Our exact results may be applied to graded biological cell suspensions, as their interior must be inhomogeneous in nature. [1] En-Bo Wei, L. Dong, K. W. Yu, Journal of Applied Physics 99, 054101(2006) [2] L. Dong, Mikko Karttunen, K. W. Yu, Phys. Rev. E, Vol. 72, art. no. 016613 (2005)

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