

The mathematics behind the close approach of two equal-sized charged spheres

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Abstract—The electrostatic interaction of two equal-sized charged spheres is mathematically related to an infinite series called the Lambert series. This series has strong significance in Number Theory and is related to other important functions such as the Jacobi Theta functions. We highlight some newly obtained results on Lambert series [1], and show their connection to the two-sphere problem. In particular, we show that our results provide insight into the difficult limiting case of the close approach of the two spheres where the classical series solutions of this two-sphere problem fail to converge.

REFERENCES

- [1] S. Banerjee and B. Wilkerson, “Asymptotic expansions of Lambert series and related q -series,” *International Journal of Number Theory*, Mar. 2017. Available: <https://doi.org/10.1142/S1793042117501135>