15th World Congress on Computational Mechanics (WCCM-XV)
8th Asian Pacific Congress on Computational Mechanics (APCOM-VIII)
31 July – 5 August 2022, Yokohama, Japan

Transport of logarithmic potentials versus process duration

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Key Words: *Transport, Dynamical Equilibrium, Logarithmic Potentials, Measurements*

Transport phenomena allow us the possibility of understanding and modeling many of the multi-scale dynamics problems of natural sciences and engineering. Particularly, in this work we transport logarithmic potentials such that its parameters are measured in order to match the dynamical balance in a context of a multiplicity of interacting forces where all can be derived from Bayesian theories in close connection with statistical meanings and actual applications. In this scenario, the Gamma function emerges lightly changed from its classical form and plays an important game allowing the time estimation of a process associated to many dynamical models. Although, the Gamma function is associated with a wide variety of applications related to natural numbers, solutions of variable coefficients differential equations, power series, integrals and much more issues in the literature for instance [1-6], this work focuses specifically on the estimation of time of duration in dynamic processes. These processes are possible in scientific experiments but also in the current life, the one people live day by day, at any scale, at any time, period or epoch. So then, three different situations are considered. First, we obtain a non-classical and not common property of the Laplace Transform, in the context of Transport equations and logarithmic potentials. Second, the Gamma function emerges as a balancing solution and it does in an apparently new generic form, so it is worthy to be presented. Third, a formulation for the duration time of a process is provided when we truly predict that the end of the process is reached, successfully. On the other way, some comments related to when we should not wait anymore the end of one process, are given. Hypothetically, this is because from the theoretical approach we should be able to know whether the end of the process will never come. Finally, some related facts are discussed.

REFERENCES

[1] Arfken, G., The Gamma Function (Factorial Function)., *Mathematical Methods for Physicists, 3rd ed. Academic Press* (1985) 339-341 and 539-572.

[2] Borwein, J. M. and Zcker, I. J., Elliptic Integral Evaluation of the Gamma Function at Rational Values of Small Denominator. *Journal of Numerical Analysis* (1992) **12**: 519-526.

[3] Davis, P. J., Leonhard Euler's Integral: A Historical Profile of the Gamma Function' *Amer. Math. Monthly* (1959) **66**: 849-869.

[4] Kreider, Kuller, Ostberg**.,** *Ecuaciones diferenciales ordinarias.* Ed. Fondo Educativo Interamericano, (1973)

[5] Kreider, Kuller, Otsberg y Perkins.**,** *Introducción al Análisis Lineal. Tomos I y II.* Ed. Fondo Educativo Interamericano, (1971)

[6] Spiegel, M., *Transformada de Laplace.* Ed. Mcgraw-Hill. Serie Schaum, (1970)