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Revisiting the Solar System and Beyond

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In a recent paper [1] on the modeling of emergent trends in complex biological and physical systems, an overview of the Bayesian approach [2] that we have used to describe the space-time curvature of a static spherically symmetric massive system was presented. The first part of this conference summarizes the main steps of this development. Reinterpreting Einstein gravitation equation in the context of an interdependence principle, we draw attention to an analogy between this equation and the Bayes' law of conditional probabilities. This leads to proposing a way to incorporate quantum mechanical probabilistic concepts into general relativity to take into account the probability of presence of energy-momentum densities. Focussing on the global field generated by a static spherically symmetric system, under weak field/low speed conditions, we show that a modified Newton's law of gravitation comes out from such a geometry, as a consequence of an asymptotic convergence predicted by the Central Limit Theorem. The resulting erfc gravitational potential has a mass specific offset which should be directly or indirectly observable in some physical phenomena. In the second part, we focus on such predictions as witnessed by an observer in the solar system. We incorporate the erfc potential into a symmetric metric [3] and briefly explain some salient consequences of this framework. Its impact on flyby maneuvers, Pioneer's delay and the astronomical unit is first analysed. Some conjectures concerning gravitational collapses, the Hubble constant and the cosmic background temperature are also discussed.

[1]Plamondon, R., O'Reilly, C., Ouellet-Plamondon, C., (2014) Strokes against Strokes, Strokes for Strides, Pattern Recognition, 47, 929-944.

[2] Plamondon, R."Patterns in Physics: Toward a Unifying Theory", Presses Internationales Polytechnique (2012).

[3] Plamondon, R., Ouellet-Plamondon, C., (2015) Emergence of a quasi Newtonian law of gravitation: a geometrical impact study, Proc. 13th Marcel Grossman Meeting on General Relativity, K. Rosquist, R.T. Jantzen, R. Ruffini, (Eds), World Scientific, Singapore, 1-3.

Primary author: Prof. PLAMONDON, Réjean (École Polytechnique de Montréal)

Presenter: Prof. PLAMONDON, Réjean (École Polytechnique de Montréal)

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