Review report on the paper entitled

"A class of non-parametric deformed exponential statistical models"

by Luigi Montrucchio and Giovanni Pistone

The authors studied some class on non-parametric deformed exponential statistical models where the deformed exponential function has linear growth at infinity and is sub-exponential at zero. Such a deformed statistical model includes the non-parametric structure introduced by N.J. Newton (2012) or the Kaniadakis κ-exponential model, but it does not include the Tsallis model.

The authors discussed the regularity of the operator for deformed exponential, and the properties of the escort densities, the divergence functions, and the Hilbert bundle structures for the deformed exponential models.

Comments to the authors

- Please give more comments or remarks about a Riemannian and a statistical manifold structure on the deformed exponential model.

  For example, is an A-divergence the canonical divergence on the deformed exponential statistical model? Does the mapping $\mathbb{U}_p^q u$ imply the parallel transport with respect to the deformed exponential connection?

Minor comments

- p.2, §2: $\int_0^1 d\xi/A d\xi = +\infty \ \rightarrow\ \int_0^1 d\xi/A < +\infty$?
- p.14, §5, Proposition 8, *3*:
  ... with reference probability measures μ_1 and μ,
  $\rightarrow$ ... with reference probability measures μ_1 and μ_2,
- p.15, §8, Proposition 8, proof:

  $$E_\mu\left[|\log_A q|^2\right] \geq \frac{1}{\alpha_2^2} E_\mu\left[|\log q|^2\right] + \alpha_1(E_\mu[q^2] - 1)$$

  Please give more calculation for this inequality. How we obtain the coefficient α_1?