

a Heaviside discontinuous functional nature have been discussed in the literature (cf., e.g., [38-40]), but never within our forthcoming methodical proposal, at least. It would be interesting to subject such mass settings to the sequel theoretical experiment, therefore.

We witness (in section 2) that a quasi-free quantum particle (i.e., subjected to $V(x) = 0$ whilst $V_{eff}(q(x)) \neq 0$) endowed with the PDM-setting of (2) would experience scattering effects manifested by the particle's by-product introduction of the derivative of the Dirac's delta interaction $\delta'(x)$ as a result of a point canonical transformation (PCT) recipe (hence, the notion of self-scattering correspondence is unavoidable). The detailed solution of which can be inferred from the scattering potential $V(q) = -a\delta(q) + b\delta'(q)$ of Gadella et al. [36] using proper parametric mappings into our model (see (14) below), of course. In this case, the reader may wish to refer to Gadella et al. [36] for the mathematical and/or physical details. Moreover, a new (the only feasibly admissible within the current methodical proposal) ordering ambiguity parameters set obtains in the process. We conclude in section 3.

2 PCT recipe and self-scattering correspondence

Under position-dependent-mass settings, the von Roos PDM Schrödinger equation [22-29] (in $\hbar = m_o = 1$ units) reads

$$\left[-\frac{1}{2}\partial_x \left(\frac{1}{m(x)} \right) \partial_x + \tilde{V}(x) \right] \psi(x) = E\psi(x), \quad (3)$$

with

$$\tilde{V}(x) = g_1 \frac{m''(x)}{m(x)^2} - g_2 \frac{m'(x)^2}{m(x)^3} \quad (4)$$