1040-46-144 **Ghislain R Franssens*** (ghislain.franssens@aeronomy.be), Ringlaan 3, B-1180 Brussels, Belgium. *Algebras of associated homogeneous distributions with applications in mathematical physics.* Preliminary report.

The set of associated homogeneous distributions (AHDs) based on $\mathbf{R}$, consists of distributional generalizations of power-log functions. AHDs are important because (i) they are frequently encountered in physics applications and (ii) recent work of the author shows that the linear space of AHDs can be extended to a convolution algebra and an isomorphic multiplication algebra.

The latter enables to give meaning to distributional products such as δ^2 and many interesting others, as a *distribution* (e.g., $\delta^2 = c\delta^{(1)}$, $c \in \mathbf{C}$ arbitrary). This makes that our multiplication product stands out from other attempts in the literature, including Colombeau's work. It is not in contradiction with Schwartz' impossibility theorem, because our definition naturally results in a product that is non-associative, fortunately in a minimal way. For details see ftp://ftp.oma.be/dist/web/franssens/A_1.pdf.

These algebras can be extended, under suitable invariant pullbacks, to algebras of AHDs based on $\mathbf{R}^{p,q}$, which then enable to (almost trivially) solve $O(p,q)$-invariant partial differential equations and integral equations with power-log convolution kernels of arbitrary complex degree. (Received January 30, 2008)