1084-60-343 **Peter M Kotelenez*** (pxk4@case.edu), Department of Mathemtics, case Western Reserve University, University Circle, Cleveland, OH 44106. *Metrics on Signed Measures and the Hahn-Jordan Decomposition for Signed Measure Valued Stochastic Partial Differential Equations.*

Let N point particles be distributed over $\mathbb{R}^d$, $d \in \mathbb{N}$. The position of the i-th particle at time t will be denoted $r(t, q^i)$ where q^i is the position at $t = 0$. $m_i \in \mathbb{R} \setminus \{0\}$ is the "weight" of the i-th particle. Let δ_r be the point measure concentrated in r and $\mathcal{X}_N(0) := \sum_{i=1}^N m_i \delta_{q^i}$ the initial mass distribution of the N point particles. The empirical mass distribution (also called the "empirical process") at time t is then given by

$$\mathcal{X}_N(t) := \sum_{i=1}^{N} m_i \delta_{r(t,q^i)} = \int \delta_{r(t,q)} \mathcal{X}_N(0, dq),$$

i.e., by the $N-$particle flow. The motion of the positions of the point particles is described by a stochastic ordinary differential equation (SODE). The resulting empirical process is the solution of a stochastic partial differential equation (SPDE) which, by a continuum limit, can be extended to an SPDE in smooth positive measures Introducing a quotient space type metric on the signed measures, we prove the preservation of the Hahn-Jordan decomposition.

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