1035-93-159 **N.U Ahmed*** (`ahmed@site.uottawa.ca`), SITE, 161 Louis Pasteur, Ottawa, Ontario K1N6N5, Canada. *Optimal Control of Systems Determined by Strongly Nonlinear Operator Valued Measures.*

In this paper we consider a class of distributed parameter systems (partial differential equations) determined by strongly nonlinear operator valued measures in the setting of the Gelfand triple $V \hookrightarrow H \hookrightarrow V^*$ with continuous and dense embeddings where H is a separable Hilbert space and V is a reflexive Banach space with dual V^*. The system is given by

$$dx + A(dt, x) = f(t, x)\gamma(dt) + B(t)u(dt), x(0) = \xi, t \in I \equiv [0, T]$$

where A is a strongly nonlinear operator valued measure mapping $\Sigma \times V$ to V^* with Σ denoting the sigma algebra of subsets of the set I and f is a nonlinear operator mapping $I \times H$ to H, γ is a countably additive bounded positive measure and the control u is a suitable vector measure. We present existence, uniqueness and regularity properties of weak solutions and then prove existence of optimal controls (vector valued measures) for a class of control problems. (Received August 05, 2007)