Local characteristics and tangent martingales in Banach spaces

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Let L be a real-valued Lévy martingale. Then we know that by the Lévy-Khinchin formula

$$\mathbb{E}e^{i\theta L_t} = \exp\Big\{t\Big(-\frac{1}{2}\sigma^2\theta^2 + \int_{\mathbb{R}} e^{i\theta x} - 1 - i\theta x\nu(dx)\Big)\Big\}, \quad t \geq 0, \ \theta \in \mathbb{R},$$

where $\sigma \geq 0$ is responsible for the *continuous* part of L and the measure ν on $\mathbb{R}$ in responsible for the *discontinuous* part of L, i.e. if we decompose $L = W + N$ into a sum of a Brownian motion W and a purely discontinuous Poisson martingale N, then the distributions of W and N are uniquely determined by σ and ν respectively.

Any real-valued martingale M has a analogue of (σ, ν) which is called the *local characteristics* of M and which is defined as the pair $([M^c], \nu^M)$ of a quadratic variation $[M^c]$ of the continuous part M^c of M and the compensator ν^M of the jump measure of M. The local characteristic have been defined and intensively studied in a number of works by Jacod, Kallenberg, Kwapień, Shiryaev, and Woyczyński, and in particular it turned out that the local characteristics uniquely determine the distribution of the corresponding martingale if and only if they are constant. Therefore the notion of *tangent* martingales (i.e. martingales with the same local characteristics) was introduced. In 2017 Kallenberg have shown sharp L^p bounds for tangent real-valued martingales.

In the present talk we will discuss the generalisation of local characteristics to Banach space-valued martingales. In particular, we will prove sharp L^p estimates for tangent martingales with values in infinite dimensions. This will help us to provide new sharp bounds for vector-valued stochastic integrals with respect to a general martingale.