Tangent martingales in Banach spaces

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Discrete tangent martingales have been introduced by Zinn in 1985; soon they turned out to be an exceptional tool while working in stochastic analysis. For example, the stochastic integration theory in UMD Banach spaces run by van Neerven, Veraar, and Weis, among other instruments is based on L^p bounds for UMD-valued tangent martingales proven by Hitczenko and McConnell in the late 80's.

The goal of the present talk is to extend the notion of tangency to both Banach spaces and the continuous-time setting. We will provide basic L^p- and ϕ-estimates for tangent martingales and prove the existence of the of the so-called decoupled tangent martingale (which e.g. in the case of a stochastic integral $\Phi \cdot W$ with respect to a Brownian motion W is nothing but $\Phi \cdot \widetilde{W}$ with $\widetilde{W}$ being an independent copy of W) which will lead us in particular to new results concerning Banach space-valued stochastic integrals with respect to a general martingale.