Ergodic theorems for hybrid sequences in a Hilbert space with applications

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In this paper, we introduce the notion of generalized hybrid sequences, extending the notion of nonexpansive sequences introduced and studied in our previous work Djafari Rouhani (1981, 1990, 1990, 1997, 2002, 2004, 2002), and prove ergodic and convergence theorems for such sequences in a Hilbert space H. Subsequently, we apply our results to prove new fixed point theorems for generalized hybrid mappings, first introduced in Kocourek et al. (2010), Takahashi and Takeuchi (2011), defined on arbitrary nonempty subsets of H.