CONVERGENCE OF COMPLEX BIGGINS MARTINGALE ON THE PHASE BOUNDARY

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Biggins [Uniform convergence of martingales in the branching random walk. *Ann. Probab.*, 20(1):137–151, 1992] proved local uniform convergence of additive martingales in d-dimensional supercritical branching random walks at complex parameters λ from an open set $\Lambda \subseteq \mathbb{C}^d$. We investigate the martingales corresponding to parameters from the boundary $\partial\Lambda$ of Λ. The martingale may diverge, vanish in the limit or converge to a non-degenerate limit. We provide mild sufficient conditions for each of these three types of limiting behaviors.