

8.30. It is not hard to check directly that X_n is a mean-one martingale. By the Borel–Cantelli lemma,

$\liminf_{n \rightarrow \infty} \gamma_n = 0$ a.s. Therefore, $X_n \rightarrow 0$ a.s. But $X_n \not\rightarrow 0$ in $L^1(P)$, since $EX_n = 1$.