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271A - Homework 1

1. (a) Let Δ_1, $\Delta_2, \ldots$ be independent random variables with mean 0 and variance 1. Let $X_1 = \Delta_1$ and for $n = 1, 2, \ldots$ let $X_{n+1} = X_n + \Delta_{n+1} f_n(X_1, \ldots, X_n)$ for f_n given bounded deterministic functions. Show that $\{X_n\}$ is a martingale (specify the filtration).

   Solution. $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad$ $\square$