Given a probability space \((\Omega, \mathcal{A}, P)\), a separable metric space \(X\) with the \(\sigma\)-algebra \(\mathcal{B}\) of all its Borel subsets and a \(\mathcal{B} \otimes \mathcal{A}\)-measurable \(f : X \times \Omega \to X\) we consider the equation

\[
\varphi(x) = \int_{\Omega} \varphi(f(x, \omega)) P(d\omega)
\]

and iterates \(f^n, n \in \mathbb{N}\), of \(f\) defined on \(X \times \Omega^\mathbb{N}\) by \(f^1(x, \omega) = f(x, \omega_1)\) and \(f^{n+1}(x, \omega) = f(f^n(x, \omega), \omega_{n+1})\). Assuming that for every \(x \in X\) the sequence \((f^n(x, \cdot))_{n \in \mathbb{N}}\) converges in law and \(\pi(x, \cdot)\) denotes the limit distribution we show that for every Borel and bounded \(u : X \to \mathbb{R}\) the function \(x \mapsto \int_X u(y) \pi(x, dy), x \in X\), is a Borel solution of (E) and we study regularity of these solutions.