Full approximative solutions of difference equations

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Asymptotic properties of solutions of difference equations of the forms

$$\Delta^m x_n = a_n \varphi(x_{\sigma(n)}) + b_n,$$

$$\Delta^m x_n = a_n f(n, x_{\sigma(n)}) + b_n$$

are studied. In the study of asymptotic properties of solutions of difference equations, so called generalized solutions are often considered, that is, sequences for which a given equation is satisfied from some starting point. We establish conditions which allow us to control the starting point. Moreover, we obtain conditions under which we can change some finite terms of generalized solutions so that a full solution is obtained. In the study of approximative solutions we use $o(n^s)$, for a given nonpositive real s, as a measure of approximation.