Criterion of coincidence of the first m digits

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It is not rare that literature which treats iterative methods for solving all kinds of equations gives small attention to stoping criterion of iterative process.

All equations can be represented in form $F(x) = 0$, where we have $F : U \to V$ and U, V are normed spaces. Unfortunately, it is not unusual that estimation of the norm of the value of the operator F is used as stoping criterion. Of course, this stoping criterion is absolutely wrong. Correct, but practically unusable, is using the inequalities which estimate the norm of the difference between the last approximation and the exact solution. The third possibility is to stop the iterative process when the norm of the difference between the two consecutive approximations is small enough (less then the given accuracy).

Exactly the third criterion was considered in this paper. The answer of the question: "How small have to be the norm of the difference of two consecutive approximations, that the probability that the given equation is solved with required accuracy become greater than given constant $p \in (0, 1)$?"

Method of the simple iterations is used as a model (this method is directly consequence of the Banch's fixed point theorem). The case $U = V = \mathbb{R}$, when the criterion "the norm of the difference between the two consecutive approximations" becomes criterion "the coincidence of the first m digits" was analyzed in more details.