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Review text:

The convergence of a continued fraction has an elementary geometric fixed-point interpretation. At present, rather surprisingly, there still exist gaps in its rigorous description based on such an idea. The author weakens some of the current though formally redundant assumptions and fills some of the gaps, obtaining several extensions of the "classical" (viz., Van Vleck, Thron and Waadeland and Perron) convergence theorems. His key point is that the current assumption of existence of certain asymptotic limits and estimates (of coefficients and/or of fixed points) may be replaced by the analogous properties of the mere supremum (lim sup) and/or infimum (lim inf.) of the corresponding sequences. Of course, this point of view admits an immediate generalization and connection to the problem of asymptotic solutions of a linear difference equation of any order and, in particular, to the related Poincare theorem. Hence, the paper is organized as starting from its appropriate strengthening.