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uniform convergence

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Let X be any set, and let (Y, d) be a metric space. A sequence $f_1, f_2, \ldots$ of functions mapping X to Y is said to be *uniformly convergent* to another function f if, for each $\varepsilon > 0$, there exists N such that, for all x and all $n > N$, we have $d(f_n(x), f(x)) < \varepsilon$. This is denoted by $f_n \xrightarrow{u} f$, or "$f_n \to f$ uniformly" or, less frequently, by $f_n \rightrightarrows f$.