An Iterated function is a function in which the output of the function is put in as the input of the function resulting in a cycle that is possibly carried out infinitely and the process is known as iteration. The sequence of numbers obtained, starting with **some initial value** is called an **orbit.**

Iterated function occurs in computer science, fractals and dynamical systems.

If *fn*(*x*) = *fn*+*m*(*x*) for some integer *m*, the orbit is called a **periodic orbit**. The smallest such value of *m* for a given *x* is called the **period of the orbit**. The point *x* itself is called a [periodic point](http://en.wikipedia.org/wiki/Periodic_point).

If *f*(*x*) = *x* for some *x* in *X*, then *x* is called a [**fixed point**](http://en.wikipedia.org/wiki/Fixed_point_(mathematics)) of the iterated sequence. The set of fixed points is often denoted as **Fix**(*f*). There exist a number of [fixed-point theorems](http://en.wikipedia.org/wiki/Fixed-point_theorem) that guarantee the existence of fixed points in various situations, including the [Banach fixed point theorem](http://en.wikipedia.org/wiki/Banach_fixed_point_theorem" \o "Banach fixed point theorem) and the [Brouwer fixed point theorem](http://en.wikipedia.org/wiki/Brouwer_fixed_point_theorem).

Upon iteration, one may find that there are sets that shrink and converge towards a single point. In such a case, the point that is converged to is known as an [attractive fixed point](http://en.wikipedia.org/wiki/Attractive_fixed_point). Conversely, iteration may give the appearance of points diverging away from a single point; this would be the case for an [unstable fixed point](http://en.wikipedia.org/wiki/Unstable_fixed_point).

There is a fixed point of f(x) by equating f(x) =x but with some initial point the sequence will converge to its fixed point is not sure because some fixed points are converging and some are diverging.

When the points of the orbit converge to one or more limits, the set of [accumulation points](http://en.wikipedia.org/wiki/Accumulation_point) of the orbit is known as the [**limit set**](http://en.wikipedia.org/wiki/Limit_set) or the **ω-limit set**.

The ideas of attraction and repulsion generalize similarly; one may categorize iterates into [stable sets](http://en.wikipedia.org/wiki/Stable_manifold) and [unstable sets](http://en.wikipedia.org/wiki/Unstable_set), according to the behaviour of small [neighborhoods](http://en.wikipedia.org/wiki/Neighborhood" \o "Neighborhood)under iteration.

Other limiting behaviours are possible; for example, [wandering points](http://en.wikipedia.org/wiki/Wandering_point) are points that move away, and never come back even close to where they started.