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Darin Orrie Brindle* (dabri8@morgan.edu), 2900 Dunleer Rd, Dundalk, MD 21222. *Continued Fractions: Methods and Applications, including finding Epsilon Periods of Almost Periodic Functions.*

The three forms of continued fractions are: terminating (which relate to simple fractions), repeating (which involve square roots) and non-repeating (all other irrationals). They have applications ranging from Diophantine equations to almost periodic functions.

Herein the well-known simplest algorithm for continued fractions is defined along with its equivalent algorithms of direct recursion of numerators and denominators.

The limit for continued fractions can be proved using standard real analysis.

And from this a major consequence is that continued fractions can be used to find actual almost periods and more for any given epsilon when combining some continuous periodic functions that result in almost periodic functions. That is there are almost periodic functions defined as $\forall \epsilon > 0 \exists P$ such that $\sup |f(x) - f(x - P)| < \epsilon$ that have algorithms to find P fitting the conditions. Which allows one to compose definitive graphs that illustrate major properties of almost periodic functions.

These graphical shifts are illustrated with their actual maximum differences that are within ϵ (Received September 15, 2015)