Simplified Masters

\[ T(n) = aT\left(\frac{n}{b}\right) + \Theta(n^d), \]
\[ a \geq 1, \]
\[ b > 1, \]
\[ d \geq 0. \]

Case 1: \( a > b^d \rightarrow T(n) = \Theta(n^{d+\epsilon}) \)
Case 2: \( a = b^d \rightarrow T(n) = \Theta(n^{d \log b}) \)
Case 3: \( a < b^d \rightarrow T(n) = \Theta(n^d) \)

Masters

\[ T(n) = aT\left(\frac{n}{b}\right) + f(n), \]
\[ a \geq 1, \]
\[ b > 1. \]

Case 1: \( f(n) = O(n^{d+\epsilon}) \rightarrow T(n) = \Theta(n^{d+\epsilon}) \) ; \( \epsilon > 0 \)
Case 2: \( f(n) = \Theta(n^{d+\epsilon}) \rightarrow T(n) = \Theta(n^{d+\epsilon \log n}) \)
Case 3: \( f(n) = \Omega(n^{d+\epsilon}) \rightarrow T(n) = \Theta(f(n)) ; \epsilon > 0 \)

in \( af\left(\frac{n}{b}\right) \leq cf(n) \) for some \( c < 1 \) and big enough \( n \)
Case 2ext: \( f(n) = \Theta(n^{d+\epsilon \log k(n)}) \rightarrow T(n) = \Theta(n^{d+\epsilon \log k+1(n)}) \)
**Akra-Bazzi**

\[ T(n) = \sum_{i=1}^{k} a_i T(b_i n) + f(n) \text{ za } n > n_0, \]

\[ n_0 \geq \frac{1}{b_i}, n_0 \geq \frac{1}{1-b_i} \text{ for each } i, \]

\[ a_i > 0 \text{ for each } i, \]

\[ 0 < b_i < 1 \text{ for each } i, \]

\[ k \geq 1, \]

\[ f(n) \text{ is non-negative function} \]

\[ c_1 f(n) \leq f(u) \leq c_2 f(n), \text{ for each } u \text{ satisfying condition: } b_i n \leq u \leq n \]

\[ T(n) = \Theta(n^p(1 + \int_1^n \frac{f(u)}{u^{p+1}} du)) \]

we get \( p \) from:

\[ \sum_{i=1}^{k} a_i b_i^p = 1 \]

**Extended Akra-Bazzi**

\[ T(n) = \sum_{i=1}^{k} a_i T(b_i n + h_i(n)) + f(n) \text{ za } n > n_0, \]

all the conditions from Akra-Bazzi still hold, plus:

\[ |h_i(n)| = O\left(\frac{n}{\log^2 n}\right) \]