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Sam Northshield* (northssw@plattsburgh.edu), Dept. of Mathematics, SUNY, Plattsburgh, NY 12901. *A Lyness equation for trees.*

The Lyness equation, $x_{n+1} = (x_n + \alpha)/x_{n-1}$, can be thought of as an equation defined on the 2-regular tree: for x, y, z vertices of that tree where y has distinct neighbors x and z ,

$$f(x)f(z) = f(y) + \alpha.$$

We generalize to the 3-regular tree T : we consider functions f on the vertices of T such that if w has distinct neighbors x, y and z , then

$$f(x)f(y) + f(x)f(z) + f(y)f(z) = f(w) + \alpha.$$

In the special case where an auxiliary condition

$$f(x) + f(y) + f(z) = \phi(f(w))$$

also holds for some ϕ , the solution is determined by (any) two values and, in some cases, an invariant can be found.

We also consider the equation $f(x)f(y)f(z) = f(w) + \alpha$. (Received August 02, 2010)