On the transcendency of the solutions of a special class of functional equations:

Corrigendum

Kurt Mahler

Mr V.E. Hoggatt, Jr, has pointed out an error in the examples of my paper [2]. If $F_m$ denotes the $m$th Fibonacci number, these examples asserted that

$$
\sum_{n=0}^{\infty} \left( \frac{F}{2^n} \right)^{-1} = s \quad \text{say},
$$

is transcendental. This is in fact false, for by a theorem of Good [1],

$$
s = \frac{(7-\sqrt{5})}{2};
$$

for it happens that

(1)

$$
\sum_{n=0}^{\infty} z^n \frac{\left(1 - z^{n+1}\right)^{-1}}{1-z} = \frac{z}{1-z}
$$

is a rational and not a transcendental function of $z$, so that Theorem 1 of my paper cannot be applied. The value of $s$ follows from (1) on putting $z = \frac{1+\sqrt{5}}{2}$.

Hence the following changes have to be made in [2].

On p. 390, lines 7 and 10, the case $k = 1$ must each time be excluded, and in Theorem 2 the two numbers $r$ and $s$ may not be both be 0.

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References


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