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Corrigendum to "Two arithmetic functions related to Euler's and Dedekind's functions". [Notes on Number Theory and Discrete Mathematics, 30(1), 179–183]

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The aim of the present corrigendum is to point out some inaccuracies and omissions in the author's paper [1], published earlier this year.

The paper was written in 2023 on the basis of some unpublished notes of mine dated back to the mid 1990s. As of the beginning of the 2000s, together with Prof. Jozsef Sándor we started writing our book [2] where we defined, following our joint paper from 1989 [3], the functions $\overline{\varphi}$ and $\overline{\sigma}$. Unfortunately, while elaborating the paper [1], I had completely forgotten about them. I am grateful to Prof. Sándor for reminding me of these facts and the functions in April 2024.

In my notes, as well as in [1], functions $\overline{\varphi}$ and $\overline{\psi}$ are being investigated. I have only now realized that if we apply the transformation changing the form of function φ to the form of $\overline{\varphi}$, yet now to the forms of the functions ψ and σ, we will receive as a result one and the same function, i.e., for any natural number n:

$$\overline{\psi}(n) = \overline{\sigma}(n).$$

In addition, Prof. Sándor pointed out a mistake in the formulation of Theorem 2.3, and, respectively, an omission in the proof of the theorem. The correct form of Theorem 2.3 is

$$n^2 - RF(n) - \overline{\varphi}(n)\overline{\psi}(n) \begin{cases} = 0, & \text{if } 1 = \omega(n) = \Omega(n) \\ < 0, & \text{if } 1 = \omega(n) < \Omega(n) \\ > 0, & \text{if } 2 \leq \omega(n) \leq \Omega(n) \end{cases} \tag{5}$$

The checks of the first and third cases in the now updated theorem are the same to the ones given in the paper, while the check of the second case is the following: Let $n = p^a$ for some prime number p and natural number $a \geq 2$. Then,

$$\begin{aligned} p^{2a} - RF(p^a) - \overline{\varphi}(p^a)\overline{\psi}(p^a) &= p^{2a} - p^{a-1} - (p^a - 1)(p^a + 1) \\ &= 1 - p^{a-1} \\ &< 0. \end{aligned}$$

References

[1] Atanassov, K. (2024). Two arithmetic functions related to Euler's and Dedekind's functions. *Notes on Number Theory and Discrete Mathematics*, 30(1), 179–183.

[2] Sándor, J., & Atanassov, K. (2021). *Arithmetic Functions*. Nova Sciences, New York.

[3] Atanassov, K., & Sándor, J. (1989). On some modifications of φ and σ functions. *Comptes Rendus de l'Academie bulgare des Sciences*, 42(1), 55–58.