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On the transcendence of Fourier and other infinite series

We investigate the transcendental nature of the sums

$$\sum_{n\in\mathbb{Z}} \frac{f(n)A(n)}{B(n)} \quad \text{and} \quad \sum_{n\in\mathbb{Z}} \frac{A(n)}{B(n)}$$

where $A(x), B(x)$ are polynomials with algebraic coefficients with $\deg A < \deg B$, f is an algebraic valued periodic function, and the sum is over integers n which are not zeros of $B(x)$. By relating these sums to the Fourier series of some special functions we are able to obtain transcendence results. In certain cases we relate these sums to a theorem of Nesterenko regarding the algebraic independence of π and $e^{\pi\sqrt{D}}$ for positive integer D.