Series representations of the Riemann and Hurwitz zeta functions and series and integral representations of the first Stieltjes constant

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We develop series representations for the Hurwitz and Riemann zeta functions in terms of generalized Bernoulli numbers (N\"{o}rlund polynomials), that give the analytic continuation of these functions to the entire complex plane. Special cases yield series representations of a wide variety of special functions and numbers, including log Gamma, the digamma, and polygamma functions. A further byproduct is that $\zeta(n)$ values emerge as nonlinear Euler sums in terms of generalized harmonic numbers. We additionally obtain series and integral representations of the first Stieltjes constant $\gamma_1(a)$. The presentation unifies some earlier results.

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