# Stieltjes-Wigert Polynomials and the $q$-Airy Function

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**Abstract**

Asymptotic formulas are derived for the Stieltjes-Wigert polynomials $S_n(z;q)$ in the complex plane, with the $q$-Airy function $A_q(z)$ being used as the approximant. One formula holds in any disc centered at the origin, and the other holds outside any smaller disc centered at the origin; the two regions together cover the whole plane. For $x > 1/4$, a limiting relation is also established between the $q$-Airy function $A_q(x)$ and the ordinary Airy function $\mathrm{Ai}(x)$ as $q \to 1$.

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