1093-11-355 **Diego Marques** and **Jonathan Sondow*** (jsondow@alumni.princeton.edu). *The Schanuel Subset Conjecture implies the Gelfond Power Tower Conjecture.*

We introduce the *Schanuel Subset Conjecture* (SSC). It states that, if the complex numbers $\alpha_1, ..., \alpha_n$ are linearly independent over $\mathbb{Q}$, and if the set $\{\alpha_1, ..., \alpha_n, e^{\alpha_1}, ..., e^{\alpha_n}\}$ is $\overline{\mathbb{Q}}$-dependent on a subset $\{\beta_1, ..., \beta_n\}$, then $\beta_1, ..., \beta_n$ are algebraically independent.

It is easily shown that *Schanuel's Conjecture implies SSC*. Are the two conjectures in fact equivalent?

In a 1934 announcement in *Comptes Rendus*, Gelfond stated a vast generalization of the Gelfond-Schneider Theorem, but he never published a proof. A special case, which we call the *Gelfond Power Tower Conjecture*, asserts that, if $z = e^{\omega}$ or $z = \alpha$, where $\omega \neq 0$ and α are algebraic numbers with α irrational, then the power towers $z^z, z^{z^z}, z^{z^{z^z}}, \ldots$ are algebraically independent.

Our main result is that, *if the Schanuel Subset Conjecture is true, then the Gelfond Power Tower Conjecture is also true.*

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