

# Schanuel's conjecture's partial resolve

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## 1

### Schanuel's conjecture

$\alpha_1, \alpha_2, \dots, \alpha_n$  are the complex numbers linearly independent.

$$\text{trans.deg}_{\mathbb{Q}}\mathbb{Q}(\alpha_1, \alpha_2, \dots, \alpha_n, e^{\alpha_1}, e^{\alpha_2}, \dots, e^{\alpha_n}) \geq n$$

Remark:  $\alpha_1, \alpha_2, \dots, \alpha_n$  is algebraic numbers case, is known as Lindemann-Weierstrass theorem

### Theorem 1.1. Lindemann-Weierstrass theorem

$\alpha_1, \alpha_2, \dots, \alpha_n$  are linearly independent algebraic numbers in  $\mathbb{C}$

$$\text{trans.deg}_{\mathbb{Q}}\mathbb{Q}(e^{\alpha_1}, e^{\alpha_2}, \dots, e^{\alpha_n}) = n$$

### Theorem 1.2. $\alpha$ is the complex number $\neq 0$

$$\text{trans.deg}_{\mathbb{Q}}\mathbb{Q}(\alpha, e^{\alpha}) \geq 1$$

**proof.**  $\alpha$  is algebraic number, use Lindemann-Weierstrass theorem,  $e^{\alpha}$  is  $\mathbb{Q}$  algebraically independent. Or  $\alpha$  is algebraically independent. 2 cases are satisfied

$$\text{trans.deg}_{\mathbb{Q}}\mathbb{Q}(\alpha, e^{\alpha}) \geq 1$$

□

Unfortunately, this proof has not new result.