Radboud University Nijmegen

Faculty of Science

Interesting Theorems

Why I Definitely Deserve a Fields Medal

Thesis BSc Mathematics

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1 Complex stuff

1.1 Domains

Let's start with the following definition:

Definition 1.1. A set $U \subseteq \mathbb{C}$ is a *domain* if:

- U is open in $\mathbb{C}$, and
- U is connected.

1.2 Yumyumyumyum

TO WRITE: an introduction and some examples

Theorem 1.2. *Suppose $n \in \mathbb{Z}$, then the following are equivalent:*

i. $n > 5$.

ii. $5 > 5$.

This doesn't seem right...

iii. *For each $n \in n$, we have:*

$$n > n + 1 > n + 1^2 > \cdots > n + 7. \tag{1}$$

where 7 is an arbitrary element of

$$\oint_a^b \operatorname{supersin} \alpha + i \operatorname{supercos} \beta db(a).$$

Remark. Interesting!

Proof. See [3]. □

Figure 1: Motivational illustration. Similar to [1, 2].

Corollary 1.2.1. *Suppose $U \subseteq \mathbb{C}$ is a domain (see Definition 1.1), and $f : \overline{U} \to \mathbb{C}$ is continuous on $\overline{U}$ and holomorphic on U. If $z \mapsto |f(z)|$ is constant on ∂U, then f has a zero in U.*

Proof. If not, consider $\frac{1}{f}$. □

The proof of this theorem is illustrated in Figure 1.

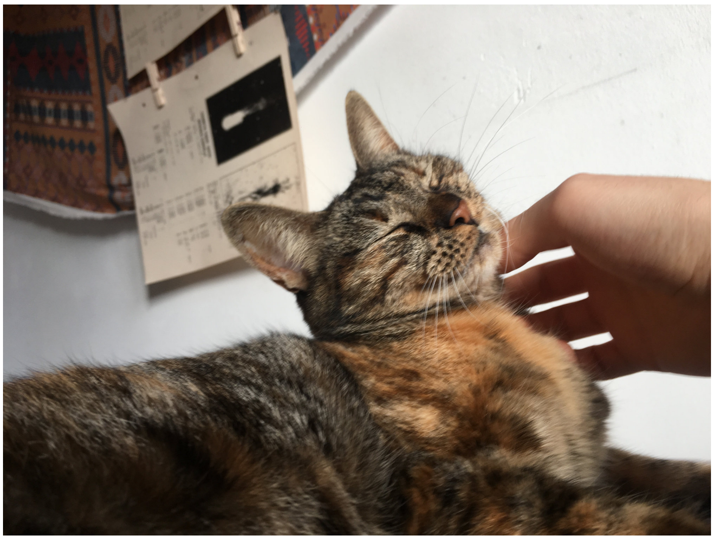

Figure 2: A cute dog.

References

[1] J. H. Oort, F. J. Kerr, and G. Westerhout. Reports on the Progress of Astronomy the Galactic System as a Spiral Nebula. *Monthly Notices of the Royal Astronomical Society*, 118(4):379–389, 8 1958.

[2] I. S. Reed and G. Solomon. Polynomial Codes Over Certain Finite Fields. *Journal of the Society for Industrial and Applied Mathematics*, 8(2):300–304, 1960.

[3] Bryan P. Rynne and Martin A. Youngson. *Linear functional analysis.* Springer, London :, 2008.