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Palindromes

Never odd or even

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Abstract

The concept of *palindromes* is introduced, and some method for finding palindromes is developed.

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Preface

I want to thank Donald Knuth for making \TeX , without which I wouldn't have written this.

1. Introduction

Palindromes are fun. I've tried to find some. In Chapter 2 previous work is reviewed, and Chapter 3 is about my results.

2. Previous work

The longest palindromic word in the *Oxford English Dictionary* is the onomatopoeic *tattarrattat*, coined by Joyce (1922) for a knock on the door. There is a growing literature where lots of palindromes are collected (Bergerson, 1973; Chism, 1992), and Joki (2015) lists some surprisingly funny ones.

In computation theory the *palindromic density* of an infinite word w over an alphabet A is defined to be zero if only finitely many prefixes are palindromes; otherwise, letting the palindromic prefixes be of lengths n_k for $k = 1, 2, \dots$ we define the density to be

$$d_P(w) = \left(\limsup_{k \rightarrow \infty} \frac{n_{k+1}}{n_k} \right)^{-1} \quad (2.1)$$

Among aperiodic words, the largest possible palindromic density is achieved by the Fibonacci word, which has density $1/\varphi$, where φ is the Golden ratio (Adamczewski and Bugeaud, 2010, p. 443).

3. Results

I examined a list of first names, and found a few there: *Anna*, *Hannah* and *Otto*.

I have also made a program that searches for anagrams. The full program is listed in appendix A on page 8.

A. Code

```
#!/usr/bin/python3

def palindrome(word):
    reverse = word[::-1]
    return word.lower() == reverse.lower()

def findem(minlength=4):
    for word in open("/local/dict/scowl.txt"):
        word = word.rstrip()    # remove newline at end
        if len(word) >= minlength and palindrome(word):
            print(word)

findem()
```


Bibliography

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