

INTERNATIONAL CONFERENCE  
St Petersburg, RUSSIA  
04 March 2020



«Metrological Support of Innovative Technologies»  
ICMSIT-2020

«Wavelet method of hiding text information in audio signals »

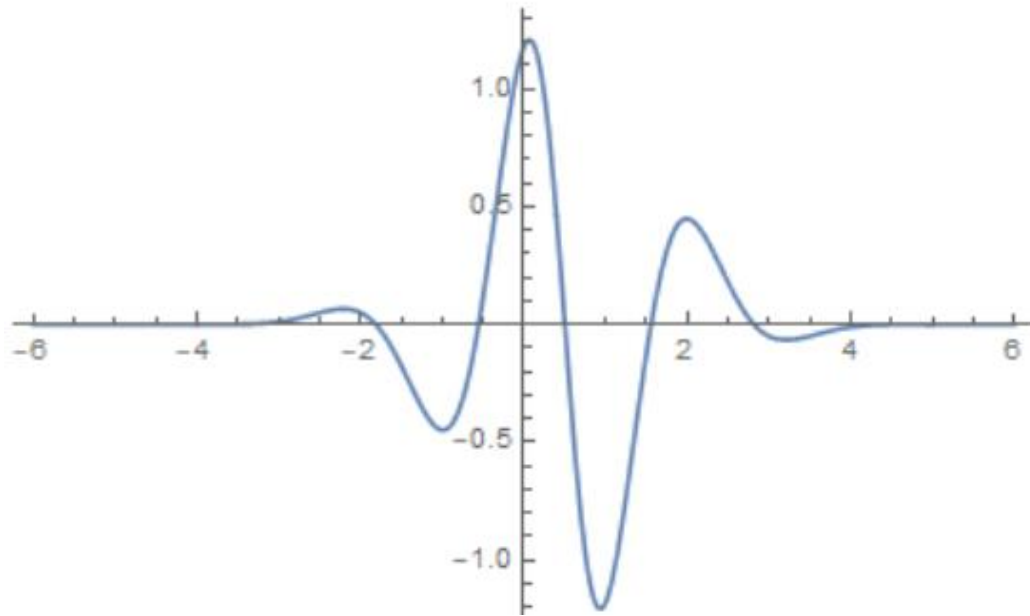
N N Manuilova, L E Khairullina, G Z Khabibullina, Ch B Minnegalieva, S V Makletsov, V V Bronskaya and O S Kharitonova



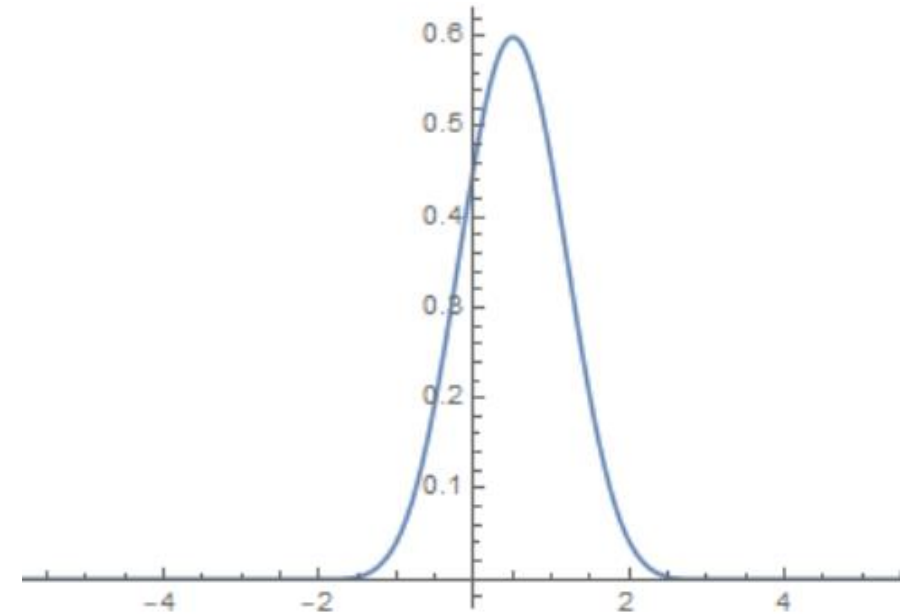
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# Problem statement

- One of the tools that allows to embed is a discrete wavelet transform. Wavelet transform is a relatively new and powerful analysis and processing tool.
- The method of secret transmission of a text message by hiding in sound files and subsequent recovery without loss is considered.
- The basic of method is a discrete wavelet transform on biorthogonal wavelets. A web application implementing this method has developed. The implementation language is Python.



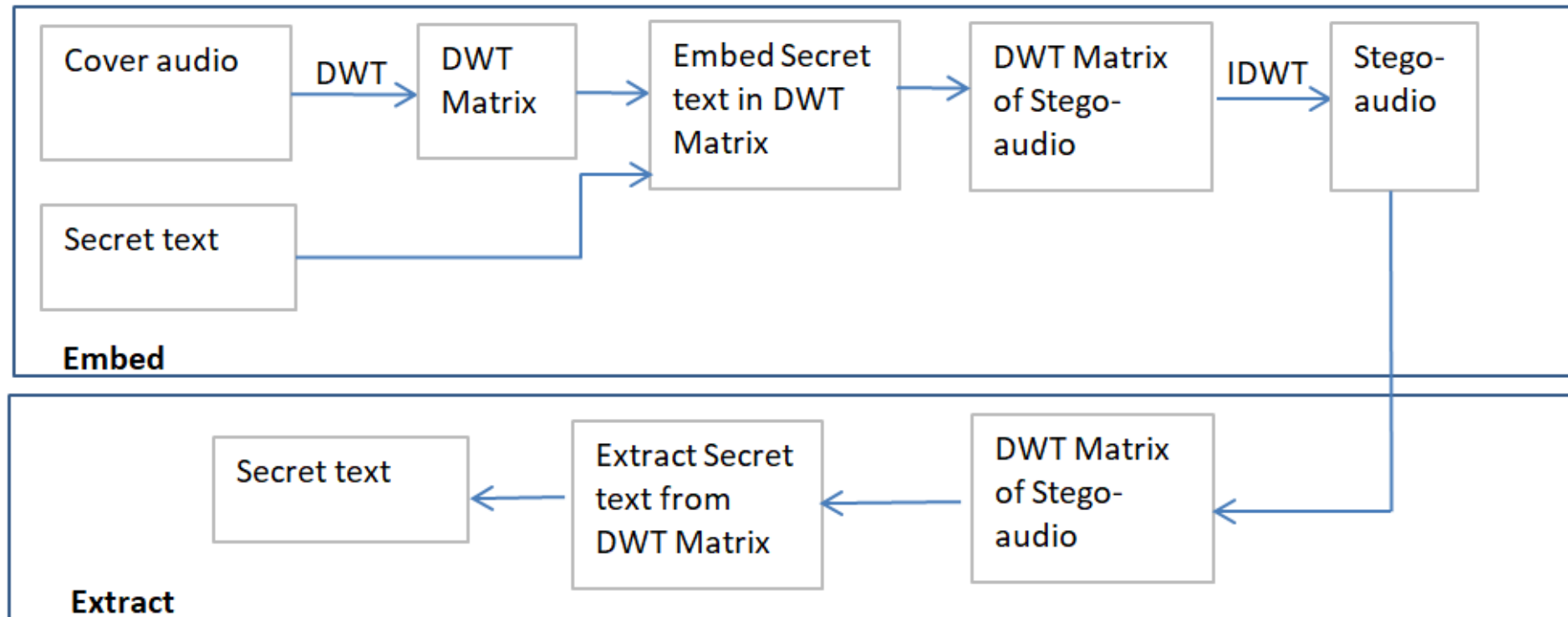
(a)



(b)

a)  $\psi$  -wavelet function  $\text{rbior5.5}$ , b)  $\phi$ -wavelet function  $\text{rbior5.5}$

## Stegosystem based on DWT.





## User interface

### Embedding

**Sound fail** `cat_meow_x.wav`


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Hello!

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**Embed**

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**Download** 

### Extracting

**Sound fail**

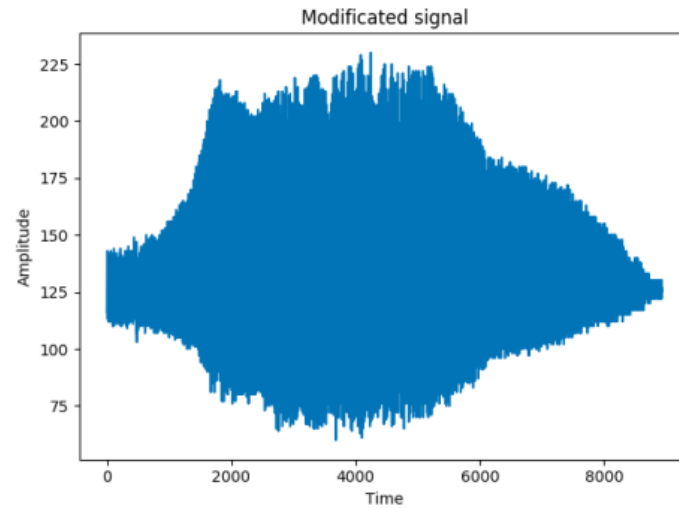
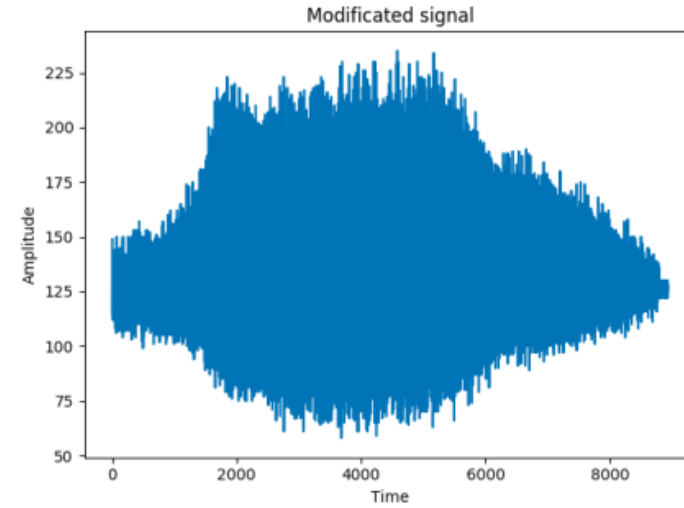
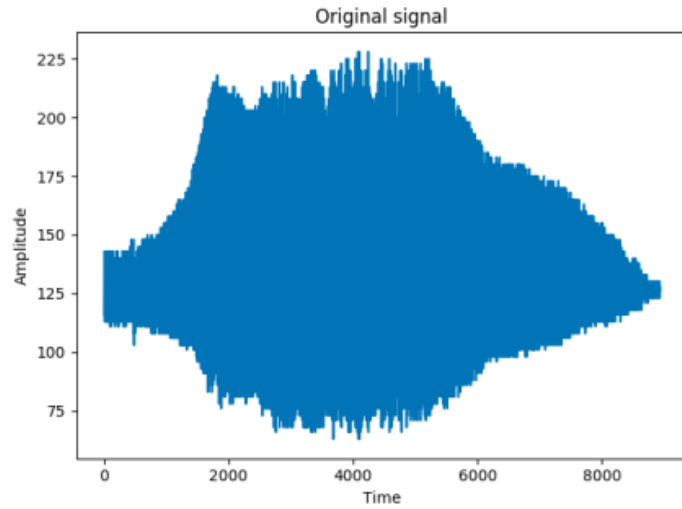
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**Extract**

---

Hello!

---



(a) original signal-container, (b) signal with embedded secret text at the decomposition level  $L = 1$ , (c) signal with embedded secret text at the decomposition level  $L = 5$

# Conclusions

## Results, implementation

- Biorthogonal wavelet transform provides reliable hiding secret information with subsequent recovery without loss.
- The space for hiding information is the coefficients of subbands obtained as a result of decomposition of the signal to the level L.
- The steganographic method using reverse biorthogonal wavelet rbio5.5 has the greatest efficiency. It was found using the PSNR calculation.
- The considered steganographic method can be used for the formation of “watermarks” for copyright protection.

# Contacts

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