

## FrEIA: Framework for Easily Invertible Architectures

an open-source Python library designed to build Invertible Neural Networks (INNs) using PyTorch. Here are the key details about FrEIA:

- **Purpose:** It allows users to create, train, and compute the inverse of complex invertible neural networks, normalizing flows, and similar architectures.
- **Key Features:**
  - **Invertibility:** Forward and inverse computations are handled automatically.
  - **Building Blocks:** Provides common invertible transformations and modules (e.g., `AllInOneBlock`, `HaarDownsampling`).
  - **Flexibility:** Enables construction of complex computation graphs and supports user-defined invertible transforms.
  - **SequenceINN:** A specialized class for creating simpler, sequential chains of invertible operations.
- **Applications:** It is used in machine learning for generative modeling, normalizing flows, and density estimation.

### FREIA'S DOCUMENTATION

<https://vislearn.github.io/FrEIA/build/html/index.html>

### ОПИСАНИЕ ПРОЕКТА:

<https://pypi.org/project/FrEIA/>

### FrEIA на GITHUB:

<https://github.com/vislearn/FrEIA>

**Реализация с помощью PyTorch+FrEIA** иллюстративного примера из статьи Ardizzone, L., et al (2019). "Analyzing inverse problems with invertible neural networks"

[<http://arxiv.org/abs/1808.04730>; см. также презентацию

[https://theory2.sinp.msu.ru/lib/exe/fetch.php/ml4gamma/wdocs/inn\\_inverseproblem.pdf](https://theory2.sinp.msu.ru/lib/exe/fetch.php/ml4gamma/wdocs/inn_inverseproblem.pdf)]:

[https://github.com/vislearn/analyzing\\_inverse\\_problems/blob/master/](https://github.com/vislearn/analyzing_inverse_problems/blob/master/)

*Реализация иллюстративного примера* из статьи Ardizzone, L., et al (2019). "Analyzing inverse problems with invertible neural networks" на основе **TensorFlow** (это **НЕ** FrEIA):

[https://github.com/jaekookang/invertible\\_neural\\_networks/tree/master](https://github.com/jaekookang/invertible_neural_networks/tree/master)