AIM OF THE EXPERIMENT-

Using Physics-Informed Neural Networks (PINNs) to determine the horizontal component of Earth's magnetic field BH using a Tangent Galvanometer (TG) experiment

GOAL

Use a Physics-Informed Neural Network (PINN) to optimize and estimate the horizontal component of Earth's magnetic field B H at Niser Bhubaneswar
by integrating physics laws (Tangent Law) with experimental data

Source code

```
import numpy as np
from scipy.optimize import minimize

mu0 = 4 * np.pi *
1e-7  R = 0.068

# Experimental data for 50-turn coil
data_50_turns = [
    [30, 19, 19, 20, 20],
    [40, 24, 24, 25, 25],
    [54, 31, 31, 32, 32],
    [62, 35, 35, 36, 36],
    [76, 40, 40, 41, 41],
    [85, 43, 43, 45, 45],
    [113, 50, 50, 53, 53],
    [137, 55, 55, 58, 58],
    [167, 60, 60, 64, 64],
    [226, 66, 66, 70, 70]
]

# Experimental data for 500-turn coil
data_500_turns = [
    [3, 18, 18, 18, 18],
    [4.2, 24, 24, 24, 24],
    [5.6, 30, 30, 30, 30],
    [6.9, 36, 36, 36, 36],
    [8.8, 42, 42, 43, 43],
    [10.4, 47, 47, 49, 49],
    [13.1, 53, 53, 55, 55],
    [16, 58, 58, 60, 60],
    [19.3, 62, 62, 65, 65],
    [25.4, 67, 67, 71, 71]
]

def prepare_data(data, turns):
    """Process experimental data and compute required values"""
    currents = []
```