

# Linear\_velocity\_BayesianKalmanNet

February 1, 2026

```
[ ]: from pathlib import Path
from scipy.io import loadmat
import sys
import os

# Use the actual notebook working directory
nb_dir = Path.cwd()
print(f"Current notebook path: {nb_dir}")

# Optionally add the notebook dir (for local-only imports)
if str(nb_dir) not in sys.path:
    sys.path.insert(0, str(nb_dir))
    print(f"Added {nb_dir} to sys.path")

# Critically: add the repository root so top-level packages like 'utils' are importable
# Notebook path: /home/luky/skola/KalmanNet-main/navigation NCLT dataset/
↳ linear_velocity_integration
# Repo root is two levels up: /home/luky/skola/KalmanNet-main
repo_root = nb_dir.parents[1]
if str(repo_root) not in sys.path:
    sys.path.insert(0, str(repo_root))
    print(f"Added {repo_root} to sys.path")
```

```
[2]: import torch
import matplotlib.pyplot as plt
from utils import trainer
from utils import utils
from Systems import DynamicSystem
import Filters
import torch.nn.functional as F
from torch.utils.data import TensorDataset, DataLoader
import numpy as np
from scipy.io import loadmat
from scipy.interpolate import RegularGridInterpolator
import random
```

```

torch.manual_seed(42)
np.random.seed(42)
random.seed(42)
if torch.cuda.is_available():
    torch.cuda.manual_seed_all(42)

device = torch.device("cuda" if torch.cuda.is_available() else "cpu")
print(f"device: {device}")

```

device: cuda

```

[3]: import torch
import matplotlib.pyplot as plt
import os
import numpy as np

# === 1. KONFIGURACE ===
# Cesta k adresáři, který vytvořil preprocess skript
data_dir = '../preprocessed_NCLT_trajectory-2012-01-22'

print(f"Načítám data z: {data_dir}...")

try:
    # === 2. NAČTENÍ DAT (.pt soubory) ===
    # Data jsou uložena jako list slovníků [{'ground_truth': ..., ↴
    # 'filtered_gps': ...}]
    # filtered_gps zde ale obsahuje náš 4D vektor [GPS_X, ODO_VX, GPS_Y, ODO_VY]

    train_data = torch.load(os.path.join(data_dir, 'train.pt'))
    val_data = torch.load(os.path.join(data_dir, 'val.pt'))
    test_data = torch.load(os.path.join(data_dir, 'test.pt'))

    # Extrakce tensorů (předpokládáme 1 trajektorii v listu)
    X_train, Y_train = train_data[0]['ground_truth'], ↴
    ↴train_data[0]['filtered_gps']
    X_val, Y_val     = val_data[0]['ground_truth'], ↴
    ↴val_data[0]['filtered_gps']
    X_test, Y_test   = test_data[0]['ground_truth'], ↴
    ↴test_data[0]['filtered_gps']

    # Spojení zpět do jedné sekvence pro vizualizaci celé trajektorie
    X_full = torch.cat([X_train, X_val, X_test], dim=0)
    Y_full = torch.cat([Y_train, Y_val, Y_test], dim=0)

    print(f" Data úspěšně načtena.")
    print(f" -> Celkový počet vzorků: {X_full.shape[0]}")

```

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    print(f"  -> Input Shape (Měření): {Y_full.shape} ... [GPS_X, ODO_VX, ..., GPS_Y, ODO_VY]")
    print(f"  -> Target Shape (GT):      {X_full.shape} ... [PX, VX, PY, VY]")

# === 3. VIZUALIZACE ===
# Převedeme na numpy pro matplotlib
gt_np = X_full.numpy()
meas_np = Y_full.numpy()
time_steps = np.arange(len(gt_np)) # Předpoklad 1Hz (DT=1.0)

fig, ax = plt.subplots(1, 3, figsize=(18, 6))

# --- A) Trajektorie (X-Y) ---
# Ground Truth (Sloupce 0 a 2 v Targetu)
ax[0].plot(gt_np[:, 0], gt_np[:, 2], 'k-', linewidth=2, label='GroundTruth')

# GPS Měření (Sloupce 0 a 2 v Inputu)
# Vykreslíme jen každý 20. bod, aby graf nebyl přeplácáný
ax[0].plot(meas_np[::20, 0], meas_np[::20, 2], 'r.', markersize=2, alpha=0.6, label='GPS Měření')

ax[0].set_title('Trajektorie (X vs Y)')
ax[0].set_xlabel('Pozice X [m]')
ax[0].set_ylabel('Pozice Y [m]')
ax[0].axis('equal')
ax[0].legend()
ax[0].grid(True, alpha=0.3)

# --- B) Rychlost X (VX) ---
# GT Rychlost (Sloupec 1 v Targetu)
ax[1].plot(time_steps, gt_np[:, 1], 'b-', linewidth=1.5, label='GT Rychlost_X')
# ODO Rychlost (Sloupec 1 v Inputu)
ax[1].plot(time_steps, meas_np[:, 1], 'g--', linewidth=1, alpha=0.8, label='Odometrie VX')

ax[1].set_title('Rychlostní profil X')
ax[1].set_xlabel('Čas [s]')
ax[1].set_ylabel('Rychlosť [m/s]')
ax[1].legend()
ax[1].grid(True, alpha=0.3)

# --- C) Rychlost Y (VY) ---
# GT Rychlost (Sloupec 3 v Targetu)
ax[2].plot(time_steps, gt_np[:, 3], 'b-', linewidth=1.5, label='GT Rychlost_Y')

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```

# ODO Rychlost (Sloupec 3 v Inputu)
ax[2].plot(time_steps, meas_np[:, 3], 'g--', linewidth=1, alpha=0.8, label='Odometrie VY')

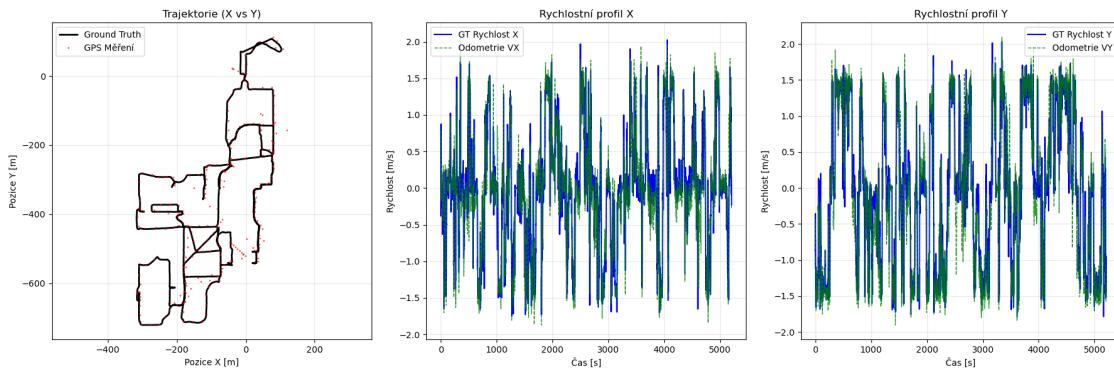
ax[2].set_title('Rychlostní profil Y')
ax[2].set_xlabel('Čas [s]')
ax[2].set_ylabel('Rychlosť [m/s]')
ax[2].legend()
ax[2].grid(True, alpha=0.3)

plt.tight_layout()
plt.show()

except FileNotFoundError:
    print(f" CHYBA: Adresář '{data_dir}' nebo soubory .pt nenalezeny.")
    print("Spustil jsi předtím skript 'preprocess_NCLT_trajectory_linear_test.py'?")
except Exception as e:
    print(f" CHYBA: {e}")

```

Načítám data z: .../preprocessed\_NCLT\_trajectory-2012-01-22...  
Data úspěšně načtena.  
-> Celkový počet vzorků: 5208  
-> Input Shape (Měření): torch.Size([5208, 4]) ... [GPS\_X, ODO\_VX, GPS\_Y, ODO\_VY]  
-> Target Shape (GT): torch.Size([5208, 4]) ... [PX, VX, PY, VY]



```

[4]: import torch
import matplotlib.pyplot as plt
import os
import numpy as np

# === 1. NAČTENÍ DAT ===
# Cesta k adresáři s daty (musí odpovídat výstupu předchozího skriptu)

```

```

data_dir = '../preprocessed_NCLT_trajectory-2012-01-22'

print(f"Načítám data pro vizualizaci z: {data_dir}...")

# Načtení listů (formát [ {'ground_truth': ..., 'filtered_gps': ...}])
train_list = torch.load(os.path.join(data_dir, 'train.pt'))
val_list = torch.load(os.path.join(data_dir, 'val.pt'))
test_list = torch.load(os.path.join(data_dir, 'test.pt'))

# Extrakce Ground Truth tensorů (předpokládáme 1 souvislou trajektorii v indexu
# 0)
# GT formát: [px, vx, py, vy] -> X je index 0, Y je index 2
train_target = train_list[0]['ground_truth']
val_target = val_list[0]['ground_truth']
test_target = test_list[0]['ground_truth']

# Spočítáme celkový počet vzorků pro titulek
N_samples = len(train_target) + len(val_target) + len(test_target)
DT = 1.0 # Víme z konfigurace

# === 2. VIZUALIZACE ROZDĚLENÍ DATASETU ===

plt.figure(figsize=(12, 10))

# 1. Vykreslení Trénovací části (85%)
plt.plot(train_target[:, 0].numpy(),
          train_target[:, 2].numpy(),
          label=f'Train Set ({len(train_target)} samples)', color='#1f77b4',
          linewidth=2)

# 2. Vykreslení Validační části (10%)
plt.plot(val_target[:, 0].numpy(),
          val_target[:, 2].numpy(),
          label=f'Validation Set ({len(val_target)} samples)', color='#ff7f0e',
          linewidth=2)

# 3. Vykreslení Testovací části (5%)
plt.plot(test_target[:, 0].numpy(),
          test_target[:, 2].numpy(),
          label=f'Test Set ({len(test_target)} samples)', color='#2ca02c',
          linewidth=2)

# Zvýraznění začátku a konce
# Start (začátek tréninku)
plt.plot(train_target[0, 0], train_target[0, 2], 'ko', markersize=10,
         label='Start (Train)')
# End (konec testu)

```

```

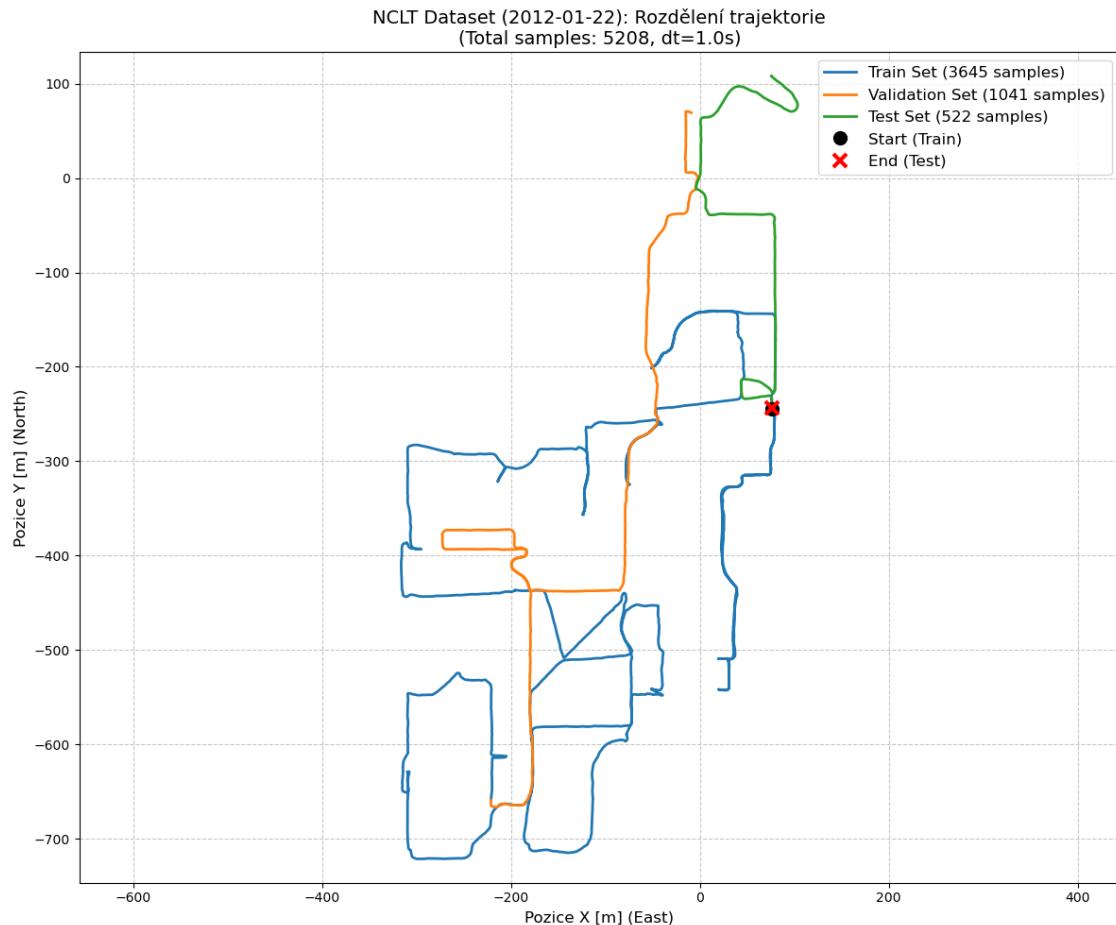
plt.plot(test_target[-1, 0], test_target[-1, 2], 'rx', markersize=10, markeredgewidth=3, label='End (Test)')

# Formátování grafu
plt.title(f'NCLT Dataset (2012-01-22): Rozdělení trajektorie\n(Total samples:{N_samples}, dt={DT}s)', fontsize=14)
plt.xlabel('Pozice X [m] (East)', fontsize=12)
plt.ylabel('Pozice Y [m] (North)', fontsize=12)
plt.legend(fontsize=12, loc='best')
plt.grid(True, linestyle='--', alpha=0.7)
plt.axis('equal') # Důležité: Aby mapa nebyla deformovaná

plt.tight_layout()
plt.show()

```

Načítám data pro vizualizaci z: ./preprocessed\_NCLT\_trajectory-2012-01-22...



# 1 Model definition

```
[5]: import torch
import math
import Systems # Tu už modul s třídou DynamicSystem

# Nastavení zařízení
device = torch.device("cuda" if torch.cuda.is_available() else "cpu")

#####
### Design Parameters - REAL SENSOR FUSION (NCLT Dataset) #####
### Cíl: Fúze reálné GPS a Odometrie s optimálními parametry #####
#####

# 1. Rozměry
# Stav: [px, vx, py, vy] (Globální souřadnice)
m = 4
n = 4
delta_t = 1.0 # Sampling (1 Hz)

# 2. Dynamika (F) - Constant Velocity Model (Newton)
#  $x_{t+1} = x_t + v_t * dt$ 
#  $v_{t+1} = v_t$ 
F_dim = torch.tensor([[1.0, delta_t],
                     [0.0, 1.0]])

# Blokově diagonální pro X a Y: [[F, 0], [0, F]]
F_design = torch.block_diag(F_dim, F_dim).float()

# 3. Měření (H) - Identita
# Nyní měříme VŠECHNY stavy přímo:
#  $y = [gps_px, odo_vx, gps_py, odo_vy]$ 
H_design = torch.eye(n).float()

# 4. Šum procesu (Q) - Fyzikální model
# Používáme "Discretized Continuous White Noise Acceleration" model.
# -----
# OPTIMALIZOVANÁ HODNOTA Z NCLT DAT (2012-01-22):
q_scale = 0.006697
# -----

# Blok Q pro jednu dimenzi (pozice, rychlosť)
Q_block = torch.tensor([[delta_t**3/3, delta_t**2/2],
                        [delta_t**2/2, delta_t]]) * q_scale

Q_design = torch.block_diag(Q_block, Q_block).float()
```

```

# 5. Šum měření (R) - Statistika z dat (Oracle)
#
# -----
# HODNOTY VYPOČTENÉ Z REZIDUÍ (Var = Std^2):
var_gps = 93.8867 # Odpovídá chybě cca 9.7 metrů
var_odo = 0.0440 # Odpovídá chybě cca 0.21 m/s
# -----


R_design = torch.tensor([[var_gps, 0.0, 0.0, 0.0],
                         [0.0, var_odo, 0.0, 0.0],
                         [0.0, 0.0, var_gps, 0.0],
                         [0.0, 0.0, 0.0, var_odo]]).float()

# 6. Počáteční podmínky
# Inicializujeme na nule s rozumnou nejistotou
m1x_0 = torch.zeros(m, 1).float()
m2x_0 = torch.eye(m).float() * 10.0 # Větší nejistota na začátku (nevíme přesně
# kde jsme)

print("\nInicializuji systém pro REÁLNOU SENZORICKOU FÚZI (NCLT)...")
print(f"Dimenze stavu: {m}, Dimenze měření: {n}")
print(f"Použité Q scale: {q_scale}")
print(f"Použité R (diag): {torch.diagonal(R_design).numpy()}")

# === INICIALIZACE SYSTÉMŮ ===

# Sys True (V tomto reálném scénáři 'Sys True' neexistuje v generativním smyslu,
# protože data nepochází z tohoto modelu, ale z reality. Nicméně pro
# kompatibilitu
# s architekturou KalmanNetu ho definujeme stejně jako Model).
sys_true = Systems.DynamicSystem(
    state_dim=m, obs_dim=n,
    Ex0=m1x_0, P0=m2x_0,
    Q=Q_design, R=R_design,
    F=F_design, H=H_design,
    device=device
)

# Sys Model (To, co používá filtr pro odhad)
sys_model = Systems.DynamicSystem(
    state_dim=m, obs_dim=n,
    Ex0=m1x_0, P0=m2x_0,
    Q=Q_design, R=R_design,
    F=F_design, H=H_design,
    device=device
)

print("... Systémy inicializovány.")

```

```
print("Model je připraven na vstup: [GPS_X, ODO_VX, GPS_Y, ODO_VY]")
```

Inicializuji systém pro REÁLNOU SENZORICKOU FÚZI (NCLT)...  
Dimenze stavu: 4, Dimenze měření: 4  
Použité Q scale: 0.006697  
Použité R (diag): [9.38867e+01 4.40000e-02 9.38867e+01 4.40000e-02]  
... Systémy inicializovány.  
Model je připraven na vstup: [GPS\_X, ODO\_VX, GPS\_Y, ODO\_VY]

```
[6]: import torch
import os
from torch.utils.data import TensorDataset, DataLoader

# === 0. NAČTENÍ PŘEZPRACOVANÝCH DAT ===
data_dir = '../preprocessed_NCLT_trajectory-2012-01-22-angle-update' # Upravu
    ↪cestu dle potřeby
print(f"Načítám data z: {data_dir}...")

try:
    train_list = torch.load(os.path.join(data_dir, 'train.pt'))
    val_list = torch.load(os.path.join(data_dir, 'val.pt'))
    test_list = torch.load(os.path.join(data_dir, 'test.pt'))

    # Extrakce tensorů
    train_target = train_list[0]['ground_truth'].float()
    val_target = val_list[0]['ground_truth'].float()
    test_target = test_list[0]['ground_truth'].float()

    train_input = train_list[0]['filtered_gps'].float()
    val_input = val_list[0]['filtered_gps'].float()
    test_input = test_list[0]['filtered_gps'].float()

    print(f"Data načtena. Train: {len(train_target)}, Val: {len(val_target)},"
        ↪Test: {len(test_target)})"

except FileNotFoundError:
    raise FileNotFoundError(f"Chybí data v {data_dir}.")
```

```
# === 1. KONFIGURACE ===
# Zde je ta změna:
TRAIN_SEQ_LEN = 50      # Krátké pro rychlý backprop
VAL_SEQ_LEN = 200        # Střední pro stabilní validaci (místo celé délky)
TEST_SEQ_LEN = len(test_target) # Test necháme celý pro finální "pravdu"

STRIDE_TRAIN = 5          # Překryv u tréninku (Data Augmentation)
STRIDE_VAL = 30           # Bez překryvu u validace (chceme nezávislé úseky)
```

```

BATCH_SIZE = 128

def create_sequences(X, Y, seq_len, stride=1):
    """
    Rozseká dlouhé tenzory na sekvence.
    """
    xs = []
    ys = []
    num_samples = X.shape[0]

    # Pokud je požadovaná délka delší než data, vrátíme co máme (pro Test)
    if seq_len >= num_samples:
        return X.unsqueeze(0), Y.unsqueeze(0)

    # Sekání
    for i in range(0, num_samples - seq_len + 1, stride):
        x_seq = X[i : i+seq_len, :]
        y_seq = Y[i : i+seq_len, :]
        xs.append(x_seq)
        ys.append(y_seq)

    if len(xs) == 0:
        return torch.empty(0, seq_len, X.shape[1]), torch.empty(0, seq_len, Y.
        ↪shape[1])

    return torch.stack(xs), torch.stack(ys)

def clean_sequences(X_seq, Y_seq, name="Dataset"):
    if X_seq.numel() == 0:
        print(f" {name}: Prázdný vstup!")
        return X_seq, Y_seq

    # Kontrola NaN/Inf
    is_nan_x = torch.isnan(X_seq).reshape(X_seq.shape[0], -1).any(dim=1)
    is_inf_x = torch.isinf(X_seq).reshape(X_seq.shape[0], -1).any(dim=1)
    is_nan_y = torch.isnan(Y_seq).reshape(Y_seq.shape[0], -1).any(dim=1)
    is_inf_y = torch.isinf(Y_seq).reshape(Y_seq.shape[0], -1).any(dim=1)

    invalid_mask = is_nan_x | is_inf_x | is_nan_y | is_inf_y
    valid_mask = ~invalid_mask

    X_clean = X_seq[valid_mask]
    Y_clean = Y_seq[valid_mask]

    n_dropped = invalid_mask.sum().item()
    if n_dropped > 0:

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        print(f" {name}: Odstraněno {n_dropped} vadných sekvencí.")
    else:
        print(f" {name}: Data jsou čistá. ({len(X_clean)} sekvencí)")

    return X_clean, Y_clean

print("\n--- ZPRACOVÁNÍ SEKVENCÍ ---")

# === 2. TVORBA SEKVENCÍ ===
print(f"Generuje TRAIN sekvence (Len={TRAIN_SEQ_LEN}, Stride={STRIDE_TRAIN})...")
train_X_raw, train_Y_raw = create_sequences(train_target, train_input,
                                             TRAIN_SEQ_LEN, STRIDE_TRAIN)

# ZMĚNA: Validace už není jedna dlouhá nudle, ale sada 1000-krokových úseků
print(f"Generuje VAL sekvence (Len={VAL_SEQ_LEN}, Stride={STRIDE_VAL})...")
val_X_raw, val_Y_raw = create_sequences(val_target, val_input, VAL_SEQ_LEN,
                                         STRIDE_VAL)

print(f"Generuje TEST sekvence (Full trajectory)...")
test_X_raw, test_Y_raw = create_sequences(test_target, test_input,
                                            TEST_SEQ_LEN, TEST_SEQ_LEN)

# === 3. ČIŠTĚNÍ DAT ===
train_X_seq, train_Y_seq = clean_sequences(train_X_raw, train_Y_raw, "Train")
val_X_seq, val_Y_seq = clean_sequences(val_X_raw, val_Y_raw, "Val")
test_X_seq, test_Y_seq = clean_sequences(test_X_raw, test_Y_raw, "Test")

# === 4. VYTVOŘENÍ DATALOADERŮ ===
print("\nVytvářím DataLoader...")

train_dataset = TensorDataset(train_X_seq, train_Y_seq)
train_loader = DataLoader(train_dataset, batch_size=BATCH_SIZE, shuffle=True)

# Val: Batch size může být nyní větší než 1, protože máme více sekvencí stejné délky!
# To zrychlí validaci.
val_dataset = TensorDataset(val_X_seq, val_Y_seq)
val_loader = DataLoader(val_dataset, batch_size=BATCH_SIZE, shuffle=False)

test_dataset = TensorDataset(test_X_seq, test_Y_seq)
test_loader = DataLoader(test_dataset, batch_size=1, shuffle=False)

print(f"\n HOTOVO.")
print(f"Train samples: {len(train_dataset)}")
print(f"Val samples: {len(val_dataset)} (Délka každé sekvence: {VAL_SEQ_LEN})")

```

```
print(f"Test samples: {len(test_dataset)} (Celá trajektorie)")
```

Načítám data z: .../preprocessed\_NCLT\_trajectory-2012-01-22-angle-update...  
Data načtena. Train: 3645, Val: 1041, Test: 522

--- ZPRACOVÁNÍ SEKVENCÍ ---  
Generuje TRAIN sekvence (Len=50, Stride=5)...  
Generuje VAL sekvence (Len=200, Stride=30)...  
Generuje TEST sekvence (Full trajectory)...  
Train: Data jsou čistá. (720 sekvencí)  
Val: Data jsou čistá. (29 sekvencí)  
Test: Data jsou čistá. (1 sekvencí)

Vytvářím DataLoadery...

HOTOVO.  
Train samples: 720  
Val samples: 29 (Délka každé sekvence: 200)  
Test samples: 1 (Celá trajektorie)

```
[7]: import torch  
import torch.nn.functional as F  
import numpy as np  
from copy import deepcopy  
  
def train_BayesianKalmanNet_Hybrid(  
    model, train_loader, val_loader, device,  
    total_train_iter, learning_rate, clip_grad,  
    J_samples, validation_period, logging_period,  
    warmup_iterations=0, weight_decay_=1e-5,  
    lambda_mse=100.0 # <--- NOVÝ PARAMETR: Kotva pro MSE  
):  
    # torch.autograd.set_detect_anomaly(True)  
    optimizer = torch.optim.AdamW(model.parameters(), lr=learning_rate, weight_decay=weight_decay_)  
  
    # Scheduler: Pokud se loss zasekne, snížíme LR (pomáhá stabilizovat konvergenci)  
    scheduler = torch.optim.lr_scheduler.ReduceLROnPlateau(  
        optimizer, mode='min', factor=0.5, patience=50, verbose=True  
    )  
  
    best_val_anees = float('inf')  
    score_at_best = {"val_nll": 0.0, "val_mse": 0.0}  
    best_iter_count = 0  
    best_model_state = None  
    train_iter_count = 0
```

```

done = False

print(f" START Hybrid Training: Loss = NLL + {lambda_mse} * MSE")

while not done:
    model.train()
    for x_true_batch, y_meas_batch in train_loader:
        if train_iter_count >= total_train_iter: done = True; break
        if torch.isnan(x_true_batch).any():
            print(f"!!! SKIP BATCH iter {train_iter_count}: NaN found in "
                  f"x_true (Ground Truth) !!!")
            continue

        x_true_batch = x_true_batch.to(device)
        y_meas_batch = y_meas_batch.to(device)

        # --- Training ---
        optimizer.zero_grad()
        batch_size, seq_len, _ = x_true_batch.shape

        all_trajectories_for_ensemble = []
        all_regs_for_ensemble = []

        # 1. Ensemble Forward Pass
        for j in range(J_samples):
            model.reset(batch_size=batch_size, initial_state=x_true_batch[:,
                0, :])
            current_trajectory_x_hats = []
            current_trajectory_regs = []
            for t in range(1, seq_len):
                y_t = y_meas_batch[:, t, :]
                x_filtered_t, reg_t = model.step(y_t)
                if torch.isnan(x_filtered_t).any():
                    raise ValueError(f"NaN in x_filtered_t at sample "
                        f"{j}, step {t}")
                current_trajectory_x_hats.append(x_filtered_t)
                current_trajectory_regs.append(reg_t)
            all_trajectories_for_ensemble.append(torch.
                stack(current_trajectory_x_hats, dim=1))
            all_regs_for_ensemble.append(torch.sum(torch.
                stack(current_trajectory_regs)))

        # 2. Statistiky Ensemble
        ensemble_trajectories = torch.stack(all_trajectories_for_ensemble,
            dim=0)
        x_hat_sequence = ensemble_trajectories.mean(dim=0)

```

```

# Epistemická variance (čistý rozptyl sítě)
# Přičítáme  $1e-9$  jen proti dělení nulou, není to "noise floor"
cov_diag_sequence = ensemble_trajectories.var(dim=0) + 1e-9

regularization_loss = torch.stack(all_regs_for_ensemble).mean()
target_sequence = x_true_batch[:, 1:, :]

# --- 3. VÝPOČET HYBRIDNÍ LOSS ---

# A) MSE Část (Přesnost)
mse_loss = F.mse_loss(x_hat_sequence, target_sequence)

# B) NLL Část (Konzistence)
#  $0.5 * (\log(var) + (target - pred)^2 / var)$ 
error_sq = (x_hat_sequence - target_sequence) ** 2
nll_loss = 0.5 * (torch.log(cov_diag_sequence) + error_sq / cov_diag_sequence).mean()

# C) Celková Loss (Hybrid)
# Zde je ta magie: I když NLL chce utéct s variancí, lambda_mse * mse ho drží zpátky
loss = nll_loss + (lambda_mse * mse_loss) + regularization_loss * 1.

if 0

if torch.isnan(loss):
    print("Collapse detected (NaN loss)"); done = True; break

loss.backward()
if clip_grad > 0: torch.nn.utils.clip_grad_norm_(model.parameters(), clip_grad)
optimizer.step()
train_iter_count += 1

# --- Logging ---
diff = x_hat_sequence - target_sequence
mean_error = diff.abs().mean().item()
min_variance = cov_diag_sequence.min().item()

if train_iter_count % logging_period == 0:
    with torch.no_grad():
        # Zjistíme dropout pravděpodobnosti (jen pro info)
        p1 = torch.sigmoid(model.dnn.concrete_dropout1.p_logit).item()
        p2 = torch.sigmoid(model.dnn.concrete_dropout2.p_logit).item()

```

```

        print(f"--- Iter [{train_iter_count}/{total_train_iter}] ---")
        print(f"    Total Loss: {loss.item():.4f}")
        print(f"    MSE Component: {mse_loss.item():.4f} (Weighted:{(mse_loss.item() * lambda_mse):.4f})")
        print(f"    NLL Component: {nll_loss.item():.4f}")
        print(f"    Min Variance: {min_variance:.2e}")
        print(f"    p1={p1:.3f}, p2={p2:.3f}")

# --- Validation step ---
if train_iter_count > 0 and train_iter_count % validation_period == 0:
    # Step scheduleru podle trénovací loss (nebo validace, pokud bys to předělal)
    scheduler.step(loss)

    print(f"\n--- Validation at iteration {train_iter_count} ---")
    model.eval()
    val_mse_list = []
    all_val_x_true_cpu, all_val_x_hat_cpu, all_val_P_hat_cpu = [], []
    for i in range(J_samples):
        with torch.no_grad():
            for x_true_val_batch, y_meas_val_batch in val_loader:
                val_batch_size, val_seq_len, _ = x_true_val_batch.shape
                x_true_val_batch = x_true_val_batch.to(device)
                y_meas_val_batch = y_meas_val_batch.to(device)
                val_ensemble_trajectories = []
                for j in range(J_samples):
                    model.reset(batch_size=val_batch_size,
                                initial_state=x_true_val_batch[:, 0, :])
                    val_current_x_hats = []
                    for t in range(1, val_seq_len):
                        y_t_val = y_meas_val_batch[:, t, :]
                        x_filtered_t, _ = model.step(y_t_val)
                        val_current_x_hats.append(x_filtered_t)
                    val_ensemble_trajectories.append(torch.stack(val_current_x_hats, dim=1))

                    # Agregace validace
                    val_ensemble = torch.stack(val_ensemble_trajectories, dim=0)
                    val_preds_seq = val_ensemble.mean(dim=0)

                    val_target_seq = x_true_val_batch[:, 1:, :]

```

```

        val_mse_list.append(F.mse_loss(val_preds_seq, □
↪val_target_seq).item())

        # Příprava pro ANEES
        initial_state_val = x_true_val_batch[:, 0, :].
↪unsqueeze(1)
        full_x_hat = torch.cat([initial_state_val, □
↪val_preds_seq], dim=1)

        # Epistemická variance
        val_covs_diag = val_ensemble.var(dim=0) + 1e-9

        # Vytvoření diagonálních matic  $P$ 
        # (Zjednodušená konstrukce pro ANEES calc)
        # Pro přesné ANEES bychom měli dělat outer product,
        # ale diagonála z var() je dobrá approximace pro BKN
        val_covs_full = torch.zeros(val_batch_size, □
↪val_seq_len-1, 4, 4, device=device)
        for b in range(val_batch_size):
            for t in range(val_seq_len-1):
                val_covs_full[b, t] = torch.
↪diag(val_covs_diag[b, t])

        P0 = model.system_model.P0.unsqueeze(0).
↪repeat(val_batch_size, 1, 1).unsqueeze(1)
        full_P_hat = torch.cat([P0, val_covs_full], dim=1)

        all_val_x_true_cpu.append(x_true_val_batch.cpu())
        all_val_x_hat_cpu.append(full_x_hat.cpu())
        all_val_P_hat_cpu.append(full_P_hat.cpu())

        avg_val_mse = np.mean(val_mse_list)
        final_x_true_list = torch.cat(all_val_x_true_cpu, dim=0)
        final_x_hat_list = torch.cat(all_val_x_hat_cpu, dim=0)
        final_P_hat_list = torch.cat(all_val_P_hat_cpu, dim=0)

        # Výpočet ANEES
        avg_val_anees = trainer.
↪calculate_anees_vectorized(final_x_true_list, final_x_hat_list, □
↪final_P_hat_list)

        print(f" Average MSE: {avg_val_mse:.4f}, Average ANEES: □
↪{avg_val_anees:.4f}")

        # Ukládání modelu:

```

```

# ZDE POZOR: Ukládáme, pokud je ANEES rozumné A ZÁROVENЬ MSE
↪není katastrofické.

# Nebo prostě ukládáme podle nejlepšího ANEES jako dřív, ale s
↪vědomím hybridní loss.

if not np.isnan(avg_val_anees) and avg_val_anees <_
↪best_val_anees and avg_val_anees > 0:
    print("  >>> New best VALIDATION ANEES! Saving model. <<<")
    best_val_anees = avg_val_anees
    best_iter_count = train_iter_count
    score_at_best['val_mse'] = avg_val_mse
    best_model_state = deepcopy(model.state_dict())
    print("-" * 50)
    model.train()

print("\nTraining completed.")
if best_model_state:
    print(f"Loading best model from iteration {best_iter_count} with ANEES"
↪{best_val_anees:.4f}")
    model.load_state_dict(best_model_state)
else:
    print("No best model was saved; returning last state.")

return {
    "best_val_anees": best_val_anees,
    "best_val_nll": score_at_best['val_nll'],
    "best_val_mse": score_at_best['val_mse'],
    "best_iter": best_iter_count,
    "final_model": model
}

```

```

[8]: import torch
import torch.nn as nn
from torch.utils.data import TensorDataset, DataLoader
import numpy as np
import os
import random
import csv
from datetime import datetime
import pandas as pd
from copy import deepcopy
from state_NN_models import StateBayesianKalmanNet

# Nastavení seedu pro reproducovatelnost tohoto běhu
torch.manual_seed(42)
np.random.seed(42)
random.seed(42)
# Změny v parametrech

```

```

state_knet = StateBayesianKalmanNet(
    sys_model,
    device=device,
    hidden_size_multiplier=10,           # Necháme
    output_layer_multiplier=4,
    num_gru_layers=1,
    init_max_dropout=0.3,               # <--- SNÍŽENO (bylo 0.6)
    init_min_dropout=0.1,               # <--- SNÍŽENO (bylo 0.4)
    norm_states=True                   # Pokud ti to s tím minule běželo, nech to,
                                    # ale LayerNorm v síti musí být!
).to(device)

train_BayesianKalmanNet_Hybrid(
    model=state_knet,
    train_loader=train_loader,
    val_loader=val_loader,
    device=device,
    total_train_iter=2000,              # Mírně delší
    learning_rate=1e-4,                 # <--- Mírně zvýšeno pro dynamiku
    warmup_iterations=0,                # <--- PRODLOUŽENO (důležité pro MSE)
    clip_grad=1.0,                     # Uvolníme trochu gradienty
    J_samples=7,                       # Pro rychlosť ladění stačí 5, na finále
    dej 10+                            # <--- NOVÝ PARAMETR: Kotva pro MSE
)

```

INFO: Aplikuji 'Start Zero' inicializaci pro Kalman Gain.

DEBUG: Výstupní vrstva vynulována (Soft Start).

```

/home/luky/.local/lib/python3.10/site-packages/torch/optim/lr_scheduler.py:28:
UserWarning: The verbose parameter is deprecated. Please use get_last_lr() to
access the learning rate.
    warnings.warn("The verbose parameter is deprecated. Please use get_last_lr() "
START Hybrid Training: Loss = NLL + 1000.0 * MSE
--- Iter [1/2000] ---
    Total Loss: 354432.2812
    MSE Component: 353.9893 (Weighted: 353989.3188)
    NLL Component: 442.8661
    Min Variance: 4.27e-07
    p1=0.258, p2=0.233
--- Iter [2/2000] ---
    Total Loss: 360292.0312
    MSE Component: 359.7486 (Weighted: 359748.5962)
    NLL Component: 543.3486

```

Min Variance: 4.02e-07  
p1=0.258, p2=0.233  
--- Iter [3/2000] ---  
Total Loss: 698427.4375  
MSE Component: 697.7944 (Weighted: 697794.3726)  
NLL Component: 632.9862  
Min Variance: 5.44e-08  
p1=0.258, p2=0.233  
--- Iter [4/2000] ---  
Total Loss: 838212.1250  
MSE Component: 837.6701 (Weighted: 837670.1050)  
NLL Component: 541.9357  
Min Variance: 4.00e-07  
p1=0.258, p2=0.233  
--- Iter [5/2000] ---  
Total Loss: 481844.5625  
MSE Component: 481.3866 (Weighted: 481386.5967)  
NLL Component: 457.8594  
Min Variance: 1.14e-07  
p1=0.258, p2=0.233  
--- Iter [6/2000] ---  
Total Loss: 680335.5000  
MSE Component: 679.7809 (Weighted: 679780.9448)  
NLL Component: 554.5103  
Min Variance: 1.77e-07  
p1=0.258, p2=0.233  
--- Iter [7/2000] ---  
Total Loss: 665994.2500  
MSE Component: 665.5992 (Weighted: 665599.1821)  
NLL Component: 394.9933  
Min Variance: 2.21e-07  
p1=0.258, p2=0.233  
--- Iter [8/2000] ---  
Total Loss: 414481.8125  
MSE Component: 414.1552 (Weighted: 414155.1514)  
NLL Component: 326.5493  
Min Variance: 7.39e-08  
p1=0.258, p2=0.233  
--- Iter [9/2000] ---  
Total Loss: 416329.6875  
MSE Component: 415.9574 (Weighted: 415957.4280)  
NLL Component: 372.1499  
Min Variance: 8.57e-08  
p1=0.258, p2=0.233  
--- Iter [10/2000] ---  
Total Loss: 438172.2812  
MSE Component: 437.8390 (Weighted: 437838.9893)  
NLL Component: 333.1835

```
Min Variance: 1.16e-06
p1=0.258, p2=0.233

--- Validation at iteration 10 ---
Average MSE: 651.3585, Average ANEES: 515.1022
>>> New best VALIDATION ANEES! Saving model. <<<
-----

--- Iter [11/2000] ---
Total Loss: 62781.6133
MSE Component: 62.5279 (Weighted: 62527.9121)
NLL Component: 253.6105
Min Variance: 5.47e-07
p1=0.258, p2=0.233
--- Iter [12/2000] ---
Total Loss: 53948.3945
MSE Component: 53.6141 (Weighted: 53614.0518)
NLL Component: 334.2537
Min Variance: 2.46e-06
p1=0.258, p2=0.233
--- Iter [13/2000] ---
Total Loss: 156693.0156
MSE Component: 156.4297 (Weighted: 156429.6875)
NLL Component: 263.2307
Min Variance: 1.32e-07
p1=0.258, p2=0.233
--- Iter [14/2000] ---
Total Loss: 72738.5703
MSE Component: 72.4745 (Weighted: 72474.4797)
NLL Component: 264.0076
Min Variance: 9.11e-07
p1=0.258, p2=0.233
--- Iter [15/2000] ---
Total Loss: 148279.8750
MSE Component: 148.1094 (Weighted: 148109.4055)
NLL Component: 170.3697
Min Variance: 9.97e-08
p1=0.258, p2=0.233
--- Iter [16/2000] ---
Total Loss: 72055.8594
MSE Component: 71.8641 (Weighted: 71864.1052)
NLL Component: 191.6695
Min Variance: 9.53e-07
p1=0.258, p2=0.233
--- Iter [17/2000] ---
Total Loss: 74060.0078
MSE Component: 73.8983 (Weighted: 73898.3078)
NLL Component: 161.6200
Min Variance: 3.64e-06
```

p1=0.258, p2=0.233  
--- Iter [18/2000] ---  
Total Loss: 95965.4766  
MSE Component: 95.7779 (Weighted: 95777.8854)  
NLL Component: 187.5102  
Min Variance: 1.22e-06  
p1=0.258, p2=0.233  
--- Iter [19/2000] ---  
Total Loss: 98568.5078  
MSE Component: 98.4089 (Weighted: 98408.8974)  
NLL Component: 159.5252  
Min Variance: 1.42e-06  
p1=0.258, p2=0.233  
--- Iter [20/2000] ---  
Total Loss: 65435.5625  
MSE Component: 65.2679 (Weighted: 65267.8680)  
NLL Component: 167.6045  
Min Variance: 5.31e-07  
p1=0.258, p2=0.233

--- Validation at iteration 20 ---  
Average MSE: 708.0764, Average ANEES: 666.3026

---

--- Iter [21/2000] ---  
Total Loss: 70844.2891  
MSE Component: 70.7244 (Weighted: 70724.4110)  
NLL Component: 119.7911  
Min Variance: 3.10e-06  
p1=0.258, p2=0.233  
--- Iter [22/2000] ---  
Total Loss: 60994.2656  
MSE Component: 60.8752 (Weighted: 60875.1945)  
NLL Component: 118.9802  
Min Variance: 6.33e-06  
p1=0.258, p2=0.233  
--- Iter [23/2000] ---  
Total Loss: 52117.8516  
MSE Component: 51.9744 (Weighted: 51974.4186)  
NLL Component: 143.3434  
Min Variance: 3.71e-07  
p1=0.258, p2=0.233  
--- Iter [24/2000] ---  
Total Loss: 51780.5586  
MSE Component: 51.6484 (Weighted: 51648.4451)  
NLL Component: 132.0215  
Min Variance: 6.32e-07  
p1=0.258, p2=0.233  
--- Iter [25/2000] ---

```

Total Loss: 31600.9688
MSE Component: 31.4843 (Weighted: 31484.3292)
NLL Component: 116.5513
Min Variance: 9.61e-07
p1=0.258, p2=0.233
--- Iter [26/2000] ---
Total Loss: 72809.5234
MSE Component: 72.7058 (Weighted: 72705.7877)
NLL Component: 103.6493
Min Variance: 3.90e-07
p1=0.258, p2=0.233
--- Iter [27/2000] ---
Total Loss: 78989.0469
MSE Component: 78.8807 (Weighted: 78880.6534)
NLL Component: 108.3013
Min Variance: 7.00e-07
p1=0.258, p2=0.233
--- Iter [28/2000] ---
Total Loss: 83475.3906
MSE Component: 83.3835 (Weighted: 83383.4763)
NLL Component: 91.8275
Min Variance: 1.67e-06
p1=0.258, p2=0.233
--- Iter [29/2000] ---
Total Loss: 48103.4883
MSE Component: 48.0028 (Weighted: 48002.7695)
NLL Component: 100.6270
Min Variance: 2.58e-06
p1=0.258, p2=0.233
--- Iter [30/2000] ---
Total Loss: 54320.6797
MSE Component: 54.2147 (Weighted: 54214.6912)
NLL Component: 105.8965
Min Variance: 1.34e-06
p1=0.258, p2=0.233

--- Validation at iteration 30 ---
Average MSE: 748.2621, Average ANEES: 754.5770
-----
--- Iter [31/2000] ---
Total Loss: 62451.0156
MSE Component: 62.3400 (Weighted: 62339.9887)
NLL Component: 110.9382
Min Variance: 1.40e-06
p1=0.258, p2=0.233
--- Iter [32/2000] ---
Total Loss: 46012.8359
MSE Component: 45.8890 (Weighted: 45889.0343)

```

NLL Component: 123.7093  
Min Variance: 7.37e-07  
p1=0.258, p2=0.233  
--- Iter [33/2000] ---  
Total Loss: 42166.9453  
MSE Component: 42.0407 (Weighted: 42040.7410)  
NLL Component: 126.1150  
Min Variance: 2.39e-06  
p1=0.258, p2=0.233  
--- Iter [34/2000] ---  
Total Loss: 46494.1016  
MSE Component: 46.3565 (Weighted: 46356.5140)  
NLL Component: 137.4965  
Min Variance: 2.96e-06  
p1=0.258, p2=0.233  
--- Iter [35/2000] ---  
Total Loss: 47877.0859  
MSE Component: 47.6982 (Weighted: 47698.1812)  
NLL Component: 178.8168  
Min Variance: 1.79e-06  
p1=0.258, p2=0.233  
--- Iter [36/2000] ---  
Total Loss: 49565.8789  
MSE Component: 49.4548 (Weighted: 49454.7729)  
NLL Component: 111.0174  
Min Variance: 3.73e-06  
p1=0.258, p2=0.233  
--- Iter [37/2000] ---  
Total Loss: 27632.1074  
MSE Component: 27.4828 (Weighted: 27482.8300)  
NLL Component: 149.1890  
Min Variance: 2.52e-06  
p1=0.258, p2=0.233  
--- Iter [38/2000] ---  
Total Loss: 69768.4922  
MSE Component: 69.6629 (Weighted: 69662.9333)  
NLL Component: 105.4787  
Min Variance: 1.60e-06  
p1=0.258, p2=0.233  
--- Iter [39/2000] ---  
Total Loss: 33506.8008  
MSE Component: 33.3777 (Weighted: 33377.7313)  
NLL Component: 128.9785  
Min Variance: 3.53e-06  
p1=0.258, p2=0.233  
--- Iter [40/2000] ---  
Total Loss: 41492.5430  
MSE Component: 41.3668 (Weighted: 41366.8098)

```
NLL Component: 125.6454
Min Variance: 5.92e-06
p1=0.258, p2=0.233

--- Validation at iteration 40 ---
Average MSE: 849.1864, Average ANEES: 942.3625
-----
--- Iter [41/2000] ---
Total Loss: 43854.2109
MSE Component: 43.7136 (Weighted: 43713.6040)
NLL Component: 140.5160
Min Variance: 8.26e-07
p1=0.258, p2=0.233
--- Iter [42/2000] ---
Total Loss: 41199.0117
MSE Component: 40.9970 (Weighted: 40997.0169)
NLL Component: 201.9081
Min Variance: 8.00e-06
p1=0.258, p2=0.233
--- Iter [43/2000] ---
Total Loss: 20158.8223
MSE Component: 20.0168 (Weighted: 20016.7885)
NLL Component: 141.9451
Min Variance: 1.27e-06
p1=0.258, p2=0.233
--- Iter [44/2000] ---
Total Loss: 58657.5781
MSE Component: 58.4831 (Weighted: 58483.0818)
NLL Component: 174.4054
Min Variance: 2.04e-06
p1=0.258, p2=0.233
--- Iter [45/2000] ---
Total Loss: 51412.4961
MSE Component: 51.2346 (Weighted: 51234.5619)
NLL Component: 177.8451
Min Variance: 8.15e-07
p1=0.258, p2=0.233
--- Iter [46/2000] ---
Total Loss: 60279.1445
MSE Component: 60.0611 (Weighted: 60061.1076)
NLL Component: 217.9471
Min Variance: 4.79e-06
p1=0.258, p2=0.233
--- Iter [47/2000] ---
Total Loss: 39713.0586
MSE Component: 39.5557 (Weighted: 39555.6946)
NLL Component: 157.2744
Min Variance: 1.85e-06
```

p1=0.258, p2=0.233  
--- Iter [48/2000] ---  
Total Loss: 40071.2266  
MSE Component: 39.8448 (Weighted: 39844.7762)  
NLL Component: 226.3604  
Min Variance: 7.93e-06  
p1=0.258, p2=0.233  
--- Iter [49/2000] ---  
Total Loss: 40540.1602  
MSE Component: 40.3978 (Weighted: 40397.8081)  
NLL Component: 142.2623  
Min Variance: 2.95e-06  
p1=0.258, p2=0.233  
--- Iter [50/2000] ---  
Total Loss: 39172.0898  
MSE Component: 39.0632 (Weighted: 39063.2401)  
NLL Component: 108.7629  
Min Variance: 3.62e-06  
p1=0.258, p2=0.233

--- Validation at iteration 50 ---  
Average MSE: 1225.1946, Average ANEES: 836.2440

-----

--- Iter [51/2000] ---  
Total Loss: 41448.7852  
MSE Component: 41.2771 (Weighted: 41277.0538)  
NLL Component: 171.6420  
Min Variance: 3.70e-06  
p1=0.258, p2=0.233  
--- Iter [52/2000] ---  
Total Loss: 42277.0781  
MSE Component: 42.1165 (Weighted: 42116.4589)  
NLL Component: 160.5319  
Min Variance: 4.17e-07  
p1=0.258, p2=0.233  
--- Iter [53/2000] ---  
Total Loss: 47373.9336  
MSE Component: 47.2005 (Weighted: 47200.5348)  
NLL Component: 173.3085  
Min Variance: 1.80e-06  
p1=0.258, p2=0.233  
--- Iter [54/2000] ---  
Total Loss: 19816.9004  
MSE Component: 19.7034 (Weighted: 19703.3844)  
NLL Component: 113.4281  
Min Variance: 4.36e-06  
p1=0.258, p2=0.233  
--- Iter [55/2000] ---

```

Total Loss: 38449.3242
MSE Component: 38.3042 (Weighted: 38304.2145)
NLL Component: 145.0206
Min Variance: 1.72e-06
p1=0.258, p2=0.233
--- Iter [56/2000] ---
Total Loss: 42542.6602
MSE Component: 42.3392 (Weighted: 42339.1647)
NLL Component: 203.4046
Min Variance: 9.42e-06
p1=0.258, p2=0.233
--- Iter [57/2000] ---
Total Loss: 41501.5000
MSE Component: 41.2852 (Weighted: 41285.1791)
NLL Component: 216.2286
Min Variance: 1.10e-06
p1=0.258, p2=0.233
--- Iter [58/2000] ---
Total Loss: 31417.5488
MSE Component: 31.3126 (Weighted: 31312.5648)
NLL Component: 104.8969
Min Variance: 5.31e-06
p1=0.258, p2=0.233
--- Iter [59/2000] ---
Total Loss: 30944.9121
MSE Component: 30.7997 (Weighted: 30799.7150)
NLL Component: 145.1086
Min Variance: 1.61e-06
p1=0.258, p2=0.233
--- Iter [60/2000] ---
Total Loss: 28015.7266
MSE Component: 27.9016 (Weighted: 27901.6209)
NLL Component: 114.0171
Min Variance: 2.73e-06
p1=0.258, p2=0.233

--- Validation at iteration 60 ---
Average MSE: 1006.4967, Average ANEES: 697.8434
-----
--- Iter [61/2000] ---
Total Loss: 26708.8164
MSE Component: 26.6037 (Weighted: 26603.7312)
NLL Component: 104.9976
Min Variance: 9.13e-07
p1=0.258, p2=0.233
--- Iter [62/2000] ---
Total Loss: 38940.8867
MSE Component: 38.7789 (Weighted: 38778.9383)

```

NLL Component: 161.8601  
Min Variance: 8.40e-06  
p1=0.258, p2=0.233  
--- Iter [63/2000] ---  
Total Loss: 26738.1895  
MSE Component: 26.6177 (Weighted: 26617.7044)  
NLL Component: 120.3960  
Min Variance: 1.49e-06  
p1=0.258, p2=0.233  
--- Iter [64/2000] ---  
Total Loss: 35282.8906  
MSE Component: 35.1593 (Weighted: 35159.3094)  
NLL Component: 123.4905  
Min Variance: 1.63e-06  
p1=0.258, p2=0.233  
--- Iter [65/2000] ---  
Total Loss: 37439.1406  
MSE Component: 37.2926 (Weighted: 37292.6102)  
NLL Component: 146.4432  
Min Variance: 1.77e-06  
p1=0.258, p2=0.233  
--- Iter [66/2000] ---  
Total Loss: 44311.4883  
MSE Component: 44.1003 (Weighted: 44100.2541)  
NLL Component: 211.1435  
Min Variance: 1.73e-06  
p1=0.258, p2=0.233  
--- Iter [67/2000] ---  
Total Loss: 24840.6113  
MSE Component: 24.6977 (Weighted: 24697.6719)  
NLL Component: 142.8508  
Min Variance: 1.32e-06  
p1=0.258, p2=0.233  
--- Iter [68/2000] ---  
Total Loss: 39147.2422  
MSE Component: 38.9359 (Weighted: 38935.9131)  
NLL Component: 211.2384  
Min Variance: 4.03e-06  
p1=0.258, p2=0.233  
--- Iter [69/2000] ---  
Total Loss: 52542.6680  
MSE Component: 52.3618 (Weighted: 52361.7554)  
NLL Component: 180.8229  
Min Variance: 6.03e-06  
p1=0.258, p2=0.233  
--- Iter [70/2000] ---  
Total Loss: 46044.7227  
MSE Component: 45.8456 (Weighted: 45845.6459)

```
NLL Component: 198.9887
Min Variance: 3.75e-06
p1=0.258, p2=0.233

--- Validation at iteration 70 ---
Average MSE: 489.8511, Average ANEES: 1771.4752
-----
--- Iter [71/2000] ---
Total Loss: 22347.6719
MSE Component: 22.2456 (Weighted: 22245.5921)
NLL Component: 101.9930
Min Variance: 2.99e-06
p1=0.258, p2=0.233
--- Iter [72/2000] ---
Total Loss: 18669.5801
MSE Component: 18.5905 (Weighted: 18590.4961)
NLL Component: 78.9964
Min Variance: 1.01e-05
p1=0.258, p2=0.233
--- Iter [73/2000] ---
Total Loss: 36611.2109
MSE Component: 36.5332 (Weighted: 36533.1917)
NLL Component: 77.9288
Min Variance: 3.13e-06
p1=0.258, p2=0.233
--- Iter [74/2000] ---
Total Loss: 78119.0859
MSE Component: 78.0414 (Weighted: 78041.3895)
NLL Component: 77.6088
Min Variance: 1.00e-05
p1=0.258, p2=0.233
--- Iter [75/2000] ---
Total Loss: 32941.5859
MSE Component: 32.8701 (Weighted: 32870.1096)
NLL Component: 71.3862
Min Variance: 1.59e-06
p1=0.258, p2=0.233
--- Iter [76/2000] ---
Total Loss: 45356.1758
MSE Component: 45.2740 (Weighted: 45273.9639)
NLL Component: 82.1208
Min Variance: 3.52e-07
p1=0.258, p2=0.233
--- Iter [77/2000] ---
Total Loss: 56855.4219
MSE Component: 56.7668 (Weighted: 56766.7999)
NLL Component: 88.5301
Min Variance: 8.10e-06
```

```

p1=0.258, p2=0.233
--- Iter [78/2000] ---
Total Loss: 41866.3164
MSE Component: 41.7591 (Weighted: 41759.1095)
NLL Component: 107.1168
Min Variance: 6.72e-07
p1=0.258, p2=0.233
--- Iter [79/2000] ---
Total Loss: 27488.9160
MSE Component: 27.3935 (Weighted: 27393.4994)
NLL Component: 95.3274
Min Variance: 4.04e-06
p1=0.258, p2=0.233
--- Iter [80/2000] ---
Total Loss: 19012.4473
MSE Component: 18.8725 (Weighted: 18872.4804)
NLL Component: 139.8793
Min Variance: 6.45e-06
p1=0.258, p2=0.233

--- Validation at iteration 80 ---
Average MSE: 341.3751, Average ANEES: 1766.0118
-----
--- Iter [81/2000] ---
Total Loss: 30461.5352
MSE Component: 30.2906 (Weighted: 30290.6017)
NLL Component: 170.8453
Min Variance: 5.38e-06
p1=0.258, p2=0.233
--- Iter [82/2000] ---
Total Loss: 57027.9922
MSE Component: 56.8774 (Weighted: 56877.3956)
NLL Component: 150.5061
Min Variance: 1.51e-06
p1=0.258, p2=0.233
--- Iter [83/2000] ---
Total Loss: 44342.1172
MSE Component: 44.1250 (Weighted: 44125.0153)
NLL Component: 217.0114
Min Variance: 7.59e-06
p1=0.258, p2=0.233
--- Iter [84/2000] ---
Total Loss: 22926.5449
MSE Component: 22.7828 (Weighted: 22782.7721)
NLL Component: 143.6855
Min Variance: 5.69e-06
p1=0.258, p2=0.233
--- Iter [85/2000] ---

```

```

Total Loss: 38909.7578
MSE Component: 38.7496 (Weighted: 38749.6452)
NLL Component: 160.0245
Min Variance: 4.79e-06
p1=0.258, p2=0.233
--- Iter [86/2000] ---
Total Loss: 36013.5547
MSE Component: 35.8699 (Weighted: 35869.8883)
NLL Component: 143.5776
Min Variance: 2.66e-06
p1=0.258, p2=0.233
--- Iter [87/2000] ---
Total Loss: 23268.0879
MSE Component: 23.1481 (Weighted: 23148.0675)
NLL Component: 119.9321
Min Variance: 1.65e-06
p1=0.258, p2=0.233
--- Iter [88/2000] ---
Total Loss: 25099.4102
MSE Component: 24.9619 (Weighted: 24961.9179)
NLL Component: 137.4035
Min Variance: 8.29e-06
p1=0.258, p2=0.233
--- Iter [89/2000] ---
Total Loss: 28830.1582
MSE Component: 28.6911 (Weighted: 28691.1297)
NLL Component: 138.9413
Min Variance: 1.23e-06
p1=0.257, p2=0.233
--- Iter [90/2000] ---
Total Loss: 42866.4961
MSE Component: 42.7783 (Weighted: 42778.2745)
NLL Component: 88.1312
Min Variance: 9.35e-07
p1=0.257, p2=0.233

--- Validation at iteration 90 ---
Average MSE: 966.1306, Average ANEES: 638.7076
-----
--- Iter [91/2000] ---
Total Loss: 28272.8555
MSE Component: 28.2053 (Weighted: 28205.3165)
NLL Component: 67.4520
Min Variance: 7.34e-06
p1=0.257, p2=0.233
--- Iter [92/2000] ---
Total Loss: 39146.4961
MSE Component: 39.0788 (Weighted: 39078.7735)

```

NLL Component: 67.6318  
Min Variance: 9.08e-06  
p1=0.257, p2=0.233  
--- Iter [93/2000] ---  
Total Loss: 45996.5547  
MSE Component: 45.9065 (Weighted: 45906.4789)  
NLL Component: 89.9842  
Min Variance: 1.55e-06  
p1=0.257, p2=0.233  
--- Iter [94/2000] ---  
Total Loss: 43452.3828  
MSE Component: 43.3841 (Weighted: 43384.1476)  
NLL Component: 68.1434  
Min Variance: 5.85e-07  
p1=0.257, p2=0.233  
--- Iter [95/2000] ---  
Total Loss: 58728.3555  
MSE Component: 58.6520 (Weighted: 58652.0348)  
NLL Component: 76.2299  
Min Variance: 9.07e-07  
p1=0.257, p2=0.233  
--- Iter [96/2000] ---  
Total Loss: 30414.7715  
MSE Component: 30.3473 (Weighted: 30347.2652)  
NLL Component: 67.4178  
Min Variance: 3.51e-06  
p1=0.257, p2=0.233  
--- Iter [97/2000] ---  
Total Loss: 26408.6113  
MSE Component: 26.2732 (Weighted: 26273.1724)  
NLL Component: 135.3516  
Min Variance: 2.07e-06  
p1=0.257, p2=0.233  
--- Iter [98/2000] ---  
Total Loss: 30454.2012  
MSE Component: 30.3806 (Weighted: 30380.6190)  
NLL Component: 73.4937  
Min Variance: 6.51e-06  
p1=0.257, p2=0.233  
--- Iter [99/2000] ---  
Total Loss: 20498.6406  
MSE Component: 20.4052 (Weighted: 20405.1514)  
NLL Component: 93.4000  
Min Variance: 2.87e-06  
p1=0.257, p2=0.233  
--- Iter [100/2000] ---  
Total Loss: 27071.1582  
MSE Component: 26.9705 (Weighted: 26970.4990)

```
NLL Component: 100.5708
Min Variance: 3.86e-06
p1=0.257, p2=0.233

--- Validation at iteration 100 ---
Average MSE: 311.8890, Average ANEES: 1687.1943
-----
--- Iter [101/2000] ---
Total Loss: 34611.2500
MSE Component: 34.4829 (Weighted: 34482.8949)
NLL Component: 128.2665
Min Variance: 6.74e-07
p1=0.257, p2=0.233
--- Iter [102/2000] ---
Total Loss: 36128.1328
MSE Component: 36.0201 (Weighted: 36020.1378)
NLL Component: 107.9078
Min Variance: 3.73e-06
p1=0.257, p2=0.233
--- Iter [103/2000] ---
Total Loss: 51120.2422
MSE Component: 50.9846 (Weighted: 50984.6230)
NLL Component: 135.5303
Min Variance: 9.94e-07
p1=0.257, p2=0.233
--- Iter [104/2000] ---
Total Loss: 19390.6465
MSE Component: 19.3083 (Weighted: 19308.2752)
NLL Component: 82.2824
Min Variance: 8.13e-06
p1=0.257, p2=0.233
--- Iter [105/2000] ---
Total Loss: 20950.7070
MSE Component: 20.8599 (Weighted: 20859.8785)
NLL Component: 90.7405
Min Variance: 6.21e-07
p1=0.257, p2=0.233
--- Iter [106/2000] ---
Total Loss: 19642.6758
MSE Component: 19.5788 (Weighted: 19578.8078)
NLL Component: 63.7793
Min Variance: 8.71e-06
p1=0.257, p2=0.233
--- Iter [107/2000] ---
Total Loss: 18763.5762
MSE Component: 18.6994 (Weighted: 18699.4209)
NLL Component: 64.0671
Min Variance: 3.68e-06
```

```

p1=0.257, p2=0.233
--- Iter [108/2000] ---
Total Loss: 29026.7227
MSE Component: 28.9640 (Weighted: 28963.9893)
NLL Component: 62.6466
Min Variance: 2.00e-06
p1=0.257, p2=0.233
--- Iter [109/2000] ---
Total Loss: 27565.3809
MSE Component: 27.5104 (Weighted: 27510.3683)
NLL Component: 54.9243
Min Variance: 2.65e-06
p1=0.257, p2=0.233
--- Iter [110/2000] ---
Total Loss: 36589.3906
MSE Component: 36.5390 (Weighted: 36538.9786)
NLL Component: 50.3192
Min Variance: 7.06e-06
p1=0.257, p2=0.233

--- Validation at iteration 110 ---
Average MSE: 847.2838, Average ANEES: 643.2669
-----
--- Iter [111/2000] ---
Total Loss: 17124.0840
MSE Component: 17.0737 (Weighted: 17073.7095)
NLL Component: 50.2878
Min Variance: 2.09e-06
p1=0.257, p2=0.233
--- Iter [112/2000] ---
Total Loss: 24730.1855
MSE Component: 24.6826 (Weighted: 24682.5790)
NLL Component: 47.5187
Min Variance: 1.48e-06
p1=0.257, p2=0.233
--- Iter [113/2000] ---
Total Loss: 26553.3027
MSE Component: 26.4990 (Weighted: 26498.9624)
NLL Component: 54.2524
Min Variance: 6.66e-06
p1=0.257, p2=0.233
--- Iter [114/2000] ---
Total Loss: 15655.6875
MSE Component: 15.6018 (Weighted: 15601.7828)
NLL Component: 53.8162
Min Variance: 7.26e-06
p1=0.257, p2=0.233
--- Iter [115/2000] ---

```

```

Total Loss: 16610.6055
MSE Component: 16.5476 (Weighted: 16547.5922)
NLL Component: 62.9257
Min Variance: 4.04e-06
p1=0.257, p2=0.233
--- Iter [116/2000] ---
Total Loss: 14962.3438
MSE Component: 14.9009 (Weighted: 14900.8865)
NLL Component: 61.3695
Min Variance: 8.49e-07
p1=0.257, p2=0.233
--- Iter [117/2000] ---
Total Loss: 24677.3809
MSE Component: 24.6157 (Weighted: 24615.7246)
NLL Component: 61.5691
Min Variance: 7.44e-07
p1=0.257, p2=0.233
--- Iter [118/2000] ---
Total Loss: 15421.5635
MSE Component: 15.3666 (Weighted: 15366.5667)
NLL Component: 54.9093
Min Variance: 1.94e-06
p1=0.257, p2=0.233
--- Iter [119/2000] ---
Total Loss: 21461.5879
MSE Component: 21.3939 (Weighted: 21393.8828)
NLL Component: 67.6165
Min Variance: 4.69e-06
p1=0.257, p2=0.233
--- Iter [120/2000] ---
Total Loss: 12277.7988
MSE Component: 12.2261 (Weighted: 12226.0580)
NLL Component: 51.6537
Min Variance: 8.23e-06
p1=0.257, p2=0.233

--- Validation at iteration 120 ---
Average MSE: 357.9628, Average ANEES: 1112.2977
-----
--- Iter [121/2000] ---
Total Loss: 20026.0469
MSE Component: 19.9569 (Weighted: 19956.8539)
NLL Component: 69.1060
Min Variance: 4.32e-06
p1=0.257, p2=0.233
--- Iter [122/2000] ---
Total Loss: 18069.0605
MSE Component: 18.0256 (Weighted: 18025.5814)

```

NLL Component: 43.3903  
Min Variance: 3.75e-06  
p1=0.257, p2=0.233  
--- Iter [123/2000] ---  
Total Loss: 20996.5508  
MSE Component: 20.9523 (Weighted: 20952.2705)  
NLL Component: 44.1935  
Min Variance: 7.01e-06  
p1=0.257, p2=0.233  
--- Iter [124/2000] ---  
Total Loss: 15792.4600  
MSE Component: 15.7362 (Weighted: 15736.1784)  
NLL Component: 56.1933  
Min Variance: 9.17e-07  
p1=0.257, p2=0.233  
--- Iter [125/2000] ---  
Total Loss: 17296.7891  
MSE Component: 17.2584 (Weighted: 17258.3523)  
NLL Component: 38.3500  
Min Variance: 3.16e-06  
p1=0.257, p2=0.233  
--- Iter [126/2000] ---  
Total Loss: 24419.1406  
MSE Component: 24.3809 (Weighted: 24380.8670)  
NLL Component: 38.1856  
Min Variance: 1.74e-06  
p1=0.257, p2=0.233  
--- Iter [127/2000] ---  
Total Loss: 24418.7754  
MSE Component: 24.3768 (Weighted: 24376.8387)  
NLL Component: 41.8502  
Min Variance: 1.46e-06  
p1=0.257, p2=0.233  
--- Iter [128/2000] ---  
Total Loss: 15688.8926  
MSE Component: 15.6425 (Weighted: 15642.4952)  
NLL Component: 46.3093  
Min Variance: 2.14e-06  
p1=0.257, p2=0.233  
--- Iter [129/2000] ---  
Total Loss: 13644.7510  
MSE Component: 13.6075 (Weighted: 13607.4619)  
NLL Component: 37.2008  
Min Variance: 9.15e-06  
p1=0.257, p2=0.233  
--- Iter [130/2000] ---  
Total Loss: 14249.8232  
MSE Component: 14.2077 (Weighted: 14207.7169)

```
NLL Component: 42.0183
Min Variance: 7.50e-06
p1=0.257, p2=0.233

--- Validation at iteration 130 ---
Average MSE: 365.2097, Average ANEES: 697.3024
-----
--- Iter [131/2000] ---
Total Loss: 15654.0303
MSE Component: 15.6068 (Weighted: 15606.8039)
NLL Component: 47.1384
Min Variance: 4.62e-06
p1=0.257, p2=0.233
--- Iter [132/2000] ---
Total Loss: 12340.0234
MSE Component: 12.2976 (Weighted: 12297.6141)
NLL Component: 42.3211
Min Variance: 1.64e-06
p1=0.257, p2=0.233
--- Iter [133/2000] ---
Total Loss: 17280.0352
MSE Component: 17.2341 (Weighted: 17234.1003)
NLL Component: 45.8481
Min Variance: 6.89e-06
p1=0.257, p2=0.233
--- Iter [134/2000] ---
Total Loss: 13398.4238
MSE Component: 13.3501 (Weighted: 13350.0671)
NLL Component: 48.2686
Min Variance: 1.93e-06
p1=0.257, p2=0.233
--- Iter [135/2000] ---
Total Loss: 16600.9824
MSE Component: 16.5621 (Weighted: 16562.1204)
NLL Component: 38.7728
Min Variance: 2.60e-06
p1=0.257, p2=0.233
--- Iter [136/2000] ---
Total Loss: 14426.2617
MSE Component: 14.3910 (Weighted: 14391.0408)
NLL Component: 35.1325
Min Variance: 7.95e-06
p1=0.257, p2=0.233
--- Iter [137/2000] ---
Total Loss: 10968.1650
MSE Component: 10.9259 (Weighted: 10925.9148)
NLL Component: 42.1617
Min Variance: 6.87e-06
```

```

p1=0.257, p2=0.233
--- Iter [138/2000] ---
Total Loss: 11930.8906
MSE Component: 11.8896 (Weighted: 11889.6160)
NLL Component: 41.1870
Min Variance: 3.57e-06
p1=0.257, p2=0.233
--- Iter [139/2000] ---
Total Loss: 18219.2480
MSE Component: 18.1814 (Weighted: 18181.4423)
NLL Component: 37.7196
Min Variance: 6.50e-06
p1=0.257, p2=0.233
--- Iter [140/2000] ---
Total Loss: 16871.9668
MSE Component: 16.8340 (Weighted: 16833.9996)
NLL Component: 37.8799
Min Variance: 2.59e-06
p1=0.257, p2=0.233

--- Validation at iteration 140 ---
Average MSE: 394.9068, Average ANEES: 644.4827
-----
--- Iter [141/2000] ---
Total Loss: 24981.9766
MSE Component: 24.9452 (Weighted: 24945.1771)
NLL Component: 36.7107
Min Variance: 2.95e-06
p1=0.257, p2=0.233
--- Iter [142/2000] ---
Total Loss: 16019.9385
MSE Component: 15.9882 (Weighted: 15988.1601)
NLL Component: 31.6908
Min Variance: 2.07e-06
p1=0.257, p2=0.233
--- Iter [143/2000] ---
Total Loss: 7280.3228
MSE Component: 7.2424 (Weighted: 7242.3716)
NLL Component: 37.8633
Min Variance: 2.00e-06
p1=0.257, p2=0.233
--- Iter [144/2000] ---
Total Loss: 9825.3408
MSE Component: 9.7903 (Weighted: 9790.2622)
NLL Component: 34.9906
Min Variance: 1.52e-05
p1=0.257, p2=0.233
--- Iter [145/2000] ---

```

```

Total Loss: 13183.4600
MSE Component: 13.1502 (Weighted: 13150.2380)
NLL Component: 33.1335
Min Variance: 7.35e-06
p1=0.257, p2=0.233
--- Iter [146/2000] ---
Total Loss: 13682.3926
MSE Component: 13.6497 (Weighted: 13649.6983)
NLL Component: 32.6064
Min Variance: 3.72e-06
p1=0.257, p2=0.233
--- Iter [147/2000] ---
Total Loss: 18636.8281
MSE Component: 18.6026 (Weighted: 18602.6154)
NLL Component: 34.1257
Min Variance: 1.05e-05
p1=0.257, p2=0.233
--- Iter [148/2000] ---
Total Loss: 15088.5732
MSE Component: 15.0371 (Weighted: 15037.1141)
NLL Component: 51.3711
Min Variance: 3.62e-06
p1=0.257, p2=0.233
--- Iter [149/2000] ---
Total Loss: 16862.5098
MSE Component: 16.8308 (Weighted: 16830.8430)
NLL Component: 31.5775
Min Variance: 3.34e-06
p1=0.257, p2=0.233
--- Iter [150/2000] ---
Total Loss: 13450.1162
MSE Component: 13.4062 (Weighted: 13406.2061)
NLL Component: 43.8226
Min Variance: 4.27e-06
p1=0.257, p2=0.233

--- Validation at iteration 150 ---
Average MSE: 511.0608, Average ANEES: 824.7819
-----
--- Iter [151/2000] ---
Total Loss: 13532.7988
MSE Component: 13.4973 (Weighted: 13497.3192)
NLL Component: 35.3914
Min Variance: 2.56e-06
p1=0.257, p2=0.233
--- Iter [152/2000] ---
Total Loss: 9200.9053
MSE Component: 9.1666 (Weighted: 9166.6002)

```

NLL Component: 34.2172  
Min Variance: 8.32e-06  
p1=0.257, p2=0.233  
--- Iter [153/2000] ---  
Total Loss: 16658.1328  
MSE Component: 16.6145 (Weighted: 16614.5306)  
NLL Component: 43.5130  
Min Variance: 1.05e-06  
p1=0.257, p2=0.233  
--- Iter [154/2000] ---  
Total Loss: 12603.4199  
MSE Component: 12.5691 (Weighted: 12569.1080)  
NLL Component: 34.2237  
Min Variance: 5.65e-06  
p1=0.257, p2=0.233  
--- Iter [155/2000] ---  
Total Loss: 13993.8818  
MSE Component: 13.9445 (Weighted: 13944.4952)  
NLL Component: 49.2993  
Min Variance: 2.63e-06  
p1=0.257, p2=0.233  
--- Iter [156/2000] ---  
Total Loss: 14398.2627  
MSE Component: 14.3555 (Weighted: 14355.5479)  
NLL Component: 42.6269  
Min Variance: 2.37e-05  
p1=0.257, p2=0.233  
--- Iter [157/2000] ---  
Total Loss: 20321.9277  
MSE Component: 20.2854 (Weighted: 20285.3699)  
NLL Component: 36.4699  
Min Variance: 4.71e-06  
p1=0.257, p2=0.233  
--- Iter [158/2000] ---  
Total Loss: 18115.1855  
MSE Component: 18.0734 (Weighted: 18073.3891)  
NLL Component: 41.7093  
Min Variance: 5.41e-06  
p1=0.257, p2=0.233  
--- Iter [159/2000] ---  
Total Loss: 12901.2432  
MSE Component: 12.8666 (Weighted: 12866.5571)  
NLL Component: 34.5989  
Min Variance: 1.91e-06  
p1=0.257, p2=0.233  
--- Iter [160/2000] ---  
Total Loss: 9945.2656  
MSE Component: 9.9082 (Weighted: 9908.2413)

```
NLL Component: 36.9364
Min Variance: 7.34e-06
p1=0.257, p2=0.233

--- Validation at iteration 160 ---
Average MSE: 366.4080, Average ANEES: 681.5052
-----
--- Iter [161/2000] ---
Total Loss: 8503.9131
MSE Component: 8.4712 (Weighted: 8471.2429)
NLL Component: 32.5819
Min Variance: 9.94e-06
p1=0.257, p2=0.233
--- Iter [162/2000] ---
Total Loss: 10571.7598
MSE Component: 10.5482 (Weighted: 10548.1644)
NLL Component: 23.5079
Min Variance: 1.40e-05
p1=0.257, p2=0.233
--- Iter [163/2000] ---
Total Loss: 15155.6621
MSE Component: 15.1188 (Weighted: 15118.7592)
NLL Component: 36.8152
Min Variance: 7.76e-06
p1=0.257, p2=0.233
--- Iter [164/2000] ---
Total Loss: 13009.6650
MSE Component: 12.9831 (Weighted: 12983.1343)
NLL Component: 26.4437
Min Variance: 9.63e-06
p1=0.257, p2=0.233
--- Iter [165/2000] ---
Total Loss: 20609.8887
MSE Component: 20.5767 (Weighted: 20576.7231)
NLL Component: 33.0791
Min Variance: 4.66e-06
p1=0.257, p2=0.233
--- Iter [166/2000] ---
Total Loss: 21583.2363
MSE Component: 21.5543 (Weighted: 21554.3137)
NLL Component: 28.8339
Min Variance: 4.16e-06
p1=0.257, p2=0.233
--- Iter [167/2000] ---
Total Loss: 18094.2695
MSE Component: 18.0635 (Weighted: 18063.5185)
NLL Component: 30.6645
Min Variance: 1.16e-06
```

```
p1=0.257, p2=0.233
--- Iter [168/2000] ---
Total Loss: 10902.2412
MSE Component: 10.8676 (Weighted: 10867.6128)
NLL Component: 34.5398
Min Variance: 2.32e-06
p1=0.257, p2=0.233
--- Iter [169/2000] ---
Total Loss: 8971.4854
MSE Component: 8.9405 (Weighted: 8940.4688)
NLL Component: 30.9288
Min Variance: 1.05e-05
p1=0.257, p2=0.233
--- Iter [170/2000] ---
Total Loss: 10371.2129
MSE Component: 10.3414 (Weighted: 10341.3658)
NLL Component: 29.7591
Min Variance: 1.02e-06
p1=0.257, p2=0.233

--- Validation at iteration 170 ---
Average MSE: 381.3537, Average ANEES: 807.5698
-----
--- Iter [171/2000] ---
Total Loss: 10009.5303
MSE Component: 9.9808 (Weighted: 9980.8187)
NLL Component: 28.6241
Min Variance: 3.12e-06
p1=0.257, p2=0.233
--- Iter [172/2000] ---
Total Loss: 8695.4824
MSE Component: 8.6559 (Weighted: 8655.9057)
NLL Component: 39.4893
Min Variance: 2.00e-06
p1=0.257, p2=0.233
--- Iter [173/2000] ---
Total Loss: 12021.4111
MSE Component: 11.9926 (Weighted: 11992.6128)
NLL Component: 28.7102
Min Variance: 1.14e-05
p1=0.257, p2=0.233
--- Iter [174/2000] ---
Total Loss: 8573.7461
MSE Component: 8.5445 (Weighted: 8544.4536)
NLL Component: 29.2039
Min Variance: 6.79e-06
p1=0.257, p2=0.233
--- Iter [175/2000] ---
```

```

Total Loss: 8831.7070
MSE Component: 8.8059 (Weighted: 8805.9120)
NLL Component: 25.7067
Min Variance: 4.98e-06
p1=0.257, p2=0.233
--- Iter [176/2000] ---
Total Loss: 13227.0488
MSE Component: 13.1980 (Weighted: 13198.0124)
NLL Component: 28.9487
Min Variance: 7.46e-06
p1=0.257, p2=0.233
--- Iter [177/2000] ---
Total Loss: 10323.6221
MSE Component: 10.2935 (Weighted: 10293.5352)
NLL Component: 29.9987
Min Variance: 2.81e-06
p1=0.257, p2=0.233
--- Iter [178/2000] ---
Total Loss: 10216.2520
MSE Component: 10.1889 (Weighted: 10188.9277)
NLL Component: 27.2362
Min Variance: 8.83e-06
p1=0.257, p2=0.233
--- Iter [179/2000] ---
Total Loss: 7322.2676
MSE Component: 7.2970 (Weighted: 7296.9980)
NLL Component: 25.1814
Min Variance: 7.00e-06
p1=0.257, p2=0.233
--- Iter [180/2000] ---
Total Loss: 7914.0654
MSE Component: 7.8906 (Weighted: 7890.5854)
NLL Component: 23.3923
Min Variance: 6.27e-06
p1=0.257, p2=0.233

--- Validation at iteration 180 ---
Average MSE: 351.3550, Average ANEES: 553.3976
-----
--- Iter [181/2000] ---
Total Loss: 9462.9004
MSE Component: 9.4365 (Weighted: 9436.5339)
NLL Component: 26.2782
Min Variance: 1.26e-05
p1=0.257, p2=0.233
--- Iter [182/2000] ---
Total Loss: 7473.3350
MSE Component: 7.4461 (Weighted: 7446.1045)

```

NLL Component: 27.1426  
Min Variance: 6.81e-06  
p1=0.257, p2=0.233  
--- Iter [183/2000] ---  
Total Loss: 6443.8491  
MSE Component: 6.4143 (Weighted: 6414.3257)  
NLL Component: 29.4354  
Min Variance: 1.96e-06  
p1=0.257, p2=0.233  
--- Iter [184/2000] ---  
Total Loss: 7750.2700  
MSE Component: 7.7201 (Weighted: 7720.0871)  
NLL Component: 30.0952  
Min Variance: 3.52e-06  
p1=0.257, p2=0.233  
--- Iter [185/2000] ---  
Total Loss: 8460.4648  
MSE Component: 8.4339 (Weighted: 8433.8980)  
NLL Component: 26.4782  
Min Variance: 5.26e-06  
p1=0.257, p2=0.233  
--- Iter [186/2000] ---  
Total Loss: 10970.7441  
MSE Component: 10.9429 (Weighted: 10942.8730)  
NLL Component: 27.7831  
Min Variance: 8.67e-06  
p1=0.257, p2=0.233  
--- Iter [187/2000] ---  
Total Loss: 9024.4766  
MSE Component: 8.9904 (Weighted: 8990.3927)  
NLL Component: 33.9960  
Min Variance: 3.40e-06  
p1=0.257, p2=0.233  
--- Iter [188/2000] ---  
Total Loss: 8976.7461  
MSE Component: 8.9446 (Weighted: 8944.6058)  
NLL Component: 32.0530  
Min Variance: 3.11e-06  
p1=0.257, p2=0.233  
--- Iter [189/2000] ---  
Total Loss: 7548.1772  
MSE Component: 7.5222 (Weighted: 7522.1720)  
NLL Component: 25.9175  
Min Variance: 1.06e-05  
p1=0.257, p2=0.233  
--- Iter [190/2000] ---  
Total Loss: 6806.7612  
MSE Component: 6.7832 (Weighted: 6783.1593)

```

NLL Component: 23.5140
Min Variance: 6.27e-06
p1=0.257, p2=0.233

--- Validation at iteration 190 ---
Average MSE: 446.3239, Average ANEES: 451.3371
>>> New best VALIDATION ANEES! Saving model. <<<
-----

--- Iter [191/2000] ---
Total Loss: 8754.4805
MSE Component: 8.7367 (Weighted: 8736.7325)
NLL Component: 17.6605
Min Variance: 7.34e-06
p1=0.257, p2=0.233
--- Iter [192/2000] ---
Total Loss: 10826.5059
MSE Component: 10.8078 (Weighted: 10807.8279)
NLL Component: 18.5899
Min Variance: 4.16e-06
p1=0.257, p2=0.233
--- Iter [193/2000] ---
Total Loss: 10575.2891
MSE Component: 10.5546 (Weighted: 10554.5607)
NLL Component: 20.6409
Min Variance: 6.19e-06
p1=0.257, p2=0.233
--- Iter [194/2000] ---
Total Loss: 8245.7354
MSE Component: 8.2274 (Weighted: 8227.4122)
NLL Component: 18.2358
Min Variance: 7.86e-06
p1=0.257, p2=0.233
--- Iter [195/2000] ---
Total Loss: 9808.8018
MSE Component: 9.7858 (Weighted: 9785.7599)
NLL Component: 22.9538
Min Variance: 5.49e-06
p1=0.257, p2=0.233
--- Iter [196/2000] ---
Total Loss: 8019.0967
MSE Component: 7.9887 (Weighted: 7988.6608)
NLL Component: 30.3482
Min Variance: 4.95e-06
p1=0.257, p2=0.233
--- Iter [197/2000] ---
Total Loss: 8578.2227
MSE Component: 8.5487 (Weighted: 8548.6746)
NLL Component: 29.4599

```

```

Min Variance: 4.81e-06
p1=0.257, p2=0.233
--- Iter [198/2000] ---
Total Loss: 4614.6948
MSE Component: 4.5893 (Weighted: 4589.2973)
NLL Component: 25.3095
Min Variance: 8.22e-06
p1=0.257, p2=0.233
--- Iter [199/2000] ---
Total Loss: 10507.0361
MSE Component: 10.4772 (Weighted: 10477.1729)
NLL Component: 29.7753
Min Variance: 6.84e-06
p1=0.257, p2=0.233
--- Iter [200/2000] ---
Total Loss: 7282.3091
MSE Component: 7.2557 (Weighted: 7255.7335)
NLL Component: 26.4878
Min Variance: 3.27e-06
p1=0.257, p2=0.233

--- Validation at iteration 200 ---
Average MSE: 344.6052, Average ANEES: 502.3636
-----
--- Iter [201/2000] ---
Total Loss: 5947.1675
MSE Component: 5.9222 (Weighted: 5922.1783)
NLL Component: 24.9014
Min Variance: 8.48e-06
p1=0.257, p2=0.233
--- Iter [202/2000] ---
Total Loss: 5908.6963
MSE Component: 5.8827 (Weighted: 5882.6799)
NLL Component: 25.9283
Min Variance: 2.93e-06
p1=0.257, p2=0.233
--- Iter [203/2000] ---
Total Loss: 6118.1001
MSE Component: 6.0932 (Weighted: 6093.1869)
NLL Component: 24.8253
Min Variance: 5.96e-06
p1=0.257, p2=0.233
--- Iter [204/2000] ---
Total Loss: 5177.0269
MSE Component: 5.1569 (Weighted: 5156.9223)
NLL Component: 20.0166
Min Variance: 2.18e-05
p1=0.257, p2=0.233

```

```

--- Iter [205/2000] ---
Total Loss: 5690.8525
MSE Component: 5.6689 (Weighted: 5668.8972)
NLL Component: 21.8677
Min Variance: 6.54e-06
p1=0.257, p2=0.233
--- Iter [206/2000] ---
Total Loss: 5965.9893
MSE Component: 5.9392 (Weighted: 5939.1742)
NLL Component: 26.7269
Min Variance: 3.70e-06
p1=0.257, p2=0.233
--- Iter [207/2000] ---
Total Loss: 6349.6953
MSE Component: 6.3231 (Weighted: 6323.0510)
NLL Component: 26.5565
Min Variance: 1.22e-05
p1=0.257, p2=0.233
--- Iter [208/2000] ---
Total Loss: 6257.1021
MSE Component: 6.2306 (Weighted: 6230.5722)
NLL Component: 26.4421
Min Variance: 5.63e-06
p1=0.257, p2=0.233
--- Iter [209/2000] ---
Total Loss: 6665.8154
MSE Component: 6.6406 (Weighted: 6640.6159)
NLL Component: 25.1116
Min Variance: 4.64e-06
p1=0.257, p2=0.233
--- Iter [210/2000] ---
Total Loss: 4396.8726
MSE Component: 4.3771 (Weighted: 4377.0514)
NLL Component: 19.7334
Min Variance: 1.21e-05
p1=0.257, p2=0.233

--- Validation at iteration 210 ---
Average MSE: 319.7701, Average ANEES: 424.5302
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [211/2000] ---
Total Loss: 3997.8782
MSE Component: 3.9703 (Weighted: 3970.3104)
NLL Component: 27.4796
Min Variance: 4.23e-06
p1=0.257, p2=0.233
--- Iter [212/2000] ---

```

Total Loss: 7060.8496  
MSE Component: 7.0367 (Weighted: 7036.7308)  
NLL Component: 24.0307  
Min Variance: 7.34e-06  
p1=0.257, p2=0.233  
--- Iter [213/2000] ---  
Total Loss: 6653.1992  
MSE Component: 6.6276 (Weighted: 6627.5945)  
NLL Component: 25.5172  
Min Variance: 1.95e-06  
p1=0.257, p2=0.233  
--- Iter [214/2000] ---  
Total Loss: 6579.8613  
MSE Component: 6.5519 (Weighted: 6551.8823)  
NLL Component: 27.8910  
Min Variance: 8.55e-06  
p1=0.257, p2=0.233  
--- Iter [215/2000] ---  
Total Loss: 7652.6289  
MSE Component: 7.6292 (Weighted: 7629.1628)  
NLL Component: 23.3782  
Min Variance: 3.23e-06  
p1=0.257, p2=0.233  
--- Iter [216/2000] ---  
Total Loss: 5932.1318  
MSE Component: 5.9062 (Weighted: 5906.2357)  
NLL Component: 25.8082  
Min Variance: 5.73e-06  
p1=0.257, p2=0.233  
--- Iter [217/2000] ---  
Total Loss: 6299.2837  
MSE Component: 6.2694 (Weighted: 6269.4111)  
NLL Component: 29.7848  
Min Variance: 2.77e-06  
p1=0.257, p2=0.233  
--- Iter [218/2000] ---  
Total Loss: 6795.1831  
MSE Component: 6.7684 (Weighted: 6768.4169)  
NLL Component: 26.6783  
Min Variance: 2.27e-06  
p1=0.257, p2=0.233  
--- Iter [219/2000] ---  
Total Loss: 6803.6499  
MSE Component: 6.7826 (Weighted: 6782.5871)  
NLL Component: 20.9749  
Min Variance: 1.64e-05  
p1=0.257, p2=0.233  
--- Iter [220/2000] ---

```
Total Loss: 7236.5391
MSE Component: 7.2180 (Weighted: 7218.0471)
NLL Component: 18.4039
Min Variance: 6.56e-06
p1=0.257, p2=0.233

--- Validation at iteration 220 ---
Average MSE: 363.8066, Average ANEES: 363.1567
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [221/2000] ---
Total Loss: 9239.2598
MSE Component: 9.2158 (Weighted: 9215.8451)
NLL Component: 23.3270
Min Variance: 1.06e-05
p1=0.257, p2=0.233
--- Iter [222/2000] ---
Total Loss: 16610.0410
MSE Component: 16.5911 (Weighted: 16591.1484)
NLL Component: 18.8047
Min Variance: 5.37e-06
p1=0.257, p2=0.233
--- Iter [223/2000] ---
Total Loss: 9298.5283
MSE Component: 9.2805 (Weighted: 9280.5300)
NLL Component: 17.9105
Min Variance: 6.41e-06
p1=0.257, p2=0.233
--- Iter [224/2000] ---
Total Loss: 11814.3369
MSE Component: 11.7915 (Weighted: 11791.4791)
NLL Component: 22.7698
Min Variance: 1.09e-05
p1=0.257, p2=0.233
--- Iter [225/2000] ---
Total Loss: 6151.3120
MSE Component: 6.1242 (Weighted: 6124.2104)
NLL Component: 27.0138
Min Variance: 3.02e-06
p1=0.257, p2=0.233
--- Iter [226/2000] ---
Total Loss: 6706.0190
MSE Component: 6.6805 (Weighted: 6680.5344)
NLL Component: 25.3972
Min Variance: 4.89e-06
p1=0.257, p2=0.233
--- Iter [227/2000] ---
Total Loss: 7564.9028
```

MSE Component: 7.5323 (Weighted: 7532.3105)  
NLL Component: 32.5044  
Min Variance: 8.01e-06  
p1=0.257, p2=0.233  
--- Iter [228/2000] ---  
Total Loss: 6988.7588  
MSE Component: 6.9650 (Weighted: 6964.9525)  
NLL Component: 23.7183  
Min Variance: 1.82e-05  
p1=0.257, p2=0.233  
--- Iter [229/2000] ---  
Total Loss: 6587.7617  
MSE Component: 6.5661 (Weighted: 6566.1449)  
NLL Component: 21.5290  
Min Variance: 3.36e-06  
p1=0.257, p2=0.233  
--- Iter [230/2000] ---  
Total Loss: 7038.8379  
MSE Component: 7.0070 (Weighted: 7007.0114)  
NLL Component: 31.7389  
Min Variance: 4.64e-06  
p1=0.257, p2=0.233

--- Validation at iteration 230 ---  
Average MSE: 341.4761, Average ANEES: 489.9104

-----

--- Iter [231/2000] ---  
Total Loss: 8376.1309  
MSE Component: 8.3439 (Weighted: 8343.9388)  
NLL Component: 32.1046  
Min Variance: 7.45e-06  
p1=0.257, p2=0.233  
--- Iter [232/2000] ---  
Total Loss: 6464.3496  
MSE Component: 6.4388 (Weighted: 6438.8089)  
NLL Component: 25.4525  
Min Variance: 7.70e-06  
p1=0.257, p2=0.233  
--- Iter [233/2000] ---  
Total Loss: 4978.0938  
MSE Component: 4.9559 (Weighted: 4955.9417)  
NLL Component: 22.0638  
Min Variance: 8.05e-06  
p1=0.257, p2=0.233  
--- Iter [234/2000] ---  
Total Loss: 5762.0640  
MSE Component: 5.7360 (Weighted: 5735.9676)  
NLL Component: 26.0081

```

Min Variance: 5.47e-06
p1=0.257, p2=0.233
--- Iter [235/2000] ---
Total Loss: 6159.7437
MSE Component: 6.1271 (Weighted: 6127.0924)
NLL Component: 32.5635
Min Variance: 4.76e-06
p1=0.257, p2=0.233
--- Iter [236/2000] ---
Total Loss: 4030.6238
MSE Component: 4.0060 (Weighted: 4005.9719)
NLL Component: 24.5638
Min Variance: 7.31e-06
p1=0.257, p2=0.233
--- Iter [237/2000] ---
Total Loss: 3117.8640
MSE Component: 3.0987 (Weighted: 3098.7267)
NLL Component: 19.0490
Min Variance: 8.84e-06
p1=0.257, p2=0.233
--- Iter [238/2000] ---
Total Loss: 6419.6567
MSE Component: 6.3959 (Weighted: 6395.9336)
NLL Component: 23.6353
Min Variance: 2.43e-06
p1=0.257, p2=0.233
--- Iter [239/2000] ---
Total Loss: 8065.3218
MSE Component: 8.0406 (Weighted: 8040.5760)
NLL Component: 24.6578
Min Variance: 6.48e-06
p1=0.257, p2=0.233
--- Iter [240/2000] ---
Total Loss: 6135.5010
MSE Component: 6.1104 (Weighted: 6110.4131)
NLL Component: 25.0002
Min Variance: 8.01e-06
p1=0.257, p2=0.233

--- Validation at iteration 240 ---
Average MSE: 313.2762, Average ANEES: 426.6173
-----
--- Iter [241/2000] ---
Total Loss: 5165.9478
MSE Component: 5.1445 (Weighted: 5144.5460)
NLL Component: 21.3141
Min Variance: 6.82e-06
p1=0.257, p2=0.233

```

```
--- Iter [242/2000] ---
Total Loss: 3965.2720
MSE Component: 3.9407 (Weighted: 3940.6996)
NLL Component: 24.4844
Min Variance: 1.07e-06
p1=0.257, p2=0.233
--- Iter [243/2000] ---
Total Loss: 5585.9785
MSE Component: 5.5610 (Weighted: 5561.0390)
NLL Component: 24.8516
Min Variance: 5.09e-06
p1=0.257, p2=0.233
--- Iter [244/2000] ---
Total Loss: 5203.8218
MSE Component: 5.1812 (Weighted: 5181.2482)
NLL Component: 22.4858
Min Variance: 1.20e-06
p1=0.257, p2=0.233
--- Iter [245/2000] ---
Total Loss: 4056.8474
MSE Component: 4.0327 (Weighted: 4032.6605)
NLL Component: 24.0989
Min Variance: 6.27e-06
p1=0.257, p2=0.233
--- Iter [246/2000] ---
Total Loss: 5677.8979
MSE Component: 5.6547 (Weighted: 5654.6669)
NLL Component: 23.1432
Min Variance: 1.67e-06
p1=0.257, p2=0.233
--- Iter [247/2000] ---
Total Loss: 4972.4897
MSE Component: 4.9468 (Weighted: 4946.7530)
NLL Component: 25.6487
Min Variance: 3.52e-06
p1=0.257, p2=0.233
--- Iter [248/2000] ---
Total Loss: 4731.7725
MSE Component: 4.7113 (Weighted: 4711.3466)
NLL Component: 20.3377
Min Variance: 4.12e-06
p1=0.257, p2=0.233
--- Iter [249/2000] ---
Total Loss: 5896.7173
MSE Component: 5.8737 (Weighted: 5873.6844)
NLL Component: 22.9448
Min Variance: 9.18e-07
p1=0.257, p2=0.233
```

```
--- Iter [250/2000] ---
Total Loss: 4235.3374
MSE Component: 4.2155 (Weighted: 4215.4994)
NLL Component: 19.7500
Min Variance: 6.55e-06
p1=0.256, p2=0.233

--- Validation at iteration 250 ---
Average MSE: 281.6511, Average ANEES: 412.8792
-----
--- Iter [251/2000] ---
Total Loss: 4700.2412
MSE Component: 4.6812 (Weighted: 4681.2463)
NLL Component: 18.9070
Min Variance: 1.26e-05
p1=0.256, p2=0.233
--- Iter [252/2000] ---
Total Loss: 6091.7788
MSE Component: 6.0541 (Weighted: 6054.1487)
NLL Component: 37.5423
Min Variance: 1.13e-05
p1=0.256, p2=0.233
--- Iter [253/2000] ---
Total Loss: 3689.6987
MSE Component: 3.6659 (Weighted: 3665.9296)
NLL Component: 23.6811
Min Variance: 1.19e-05
p1=0.256, p2=0.233
--- Iter [254/2000] ---
Total Loss: 4953.4663
MSE Component: 4.9306 (Weighted: 4930.5644)
NLL Component: 22.8141
Min Variance: 7.56e-06
p1=0.256, p2=0.233
--- Iter [255/2000] ---
Total Loss: 6003.3706
MSE Component: 5.9820 (Weighted: 5982.0065)
NLL Component: 21.2764
Min Variance: 3.46e-06
p1=0.256, p2=0.233
--- Iter [256/2000] ---
Total Loss: 4852.7515
MSE Component: 4.8270 (Weighted: 4826.9606)
NLL Component: 25.7030
Min Variance: 2.20e-06
p1=0.256, p2=0.233
--- Iter [257/2000] ---
Total Loss: 4815.2485
```

MSE Component: 4.7893 (Weighted: 4789.3109)  
 NLL Component: 25.8498  
 Min Variance: 4.45e-06  
 p1=0.256, p2=0.233  
 --- Iter [258/2000] ---  
 Total Loss: 4368.2290  
 MSE Component: 4.3399 (Weighted: 4339.9086)  
 NLL Component: 28.2324  
 Min Variance: 5.76e-06  
 p1=0.256, p2=0.233  
 --- Iter [259/2000] ---  
 Total Loss: 5007.6191  
 MSE Component: 4.9835 (Weighted: 4983.4723)  
 NLL Component: 24.0591  
 Min Variance: 8.94e-06  
 p1=0.256, p2=0.233  
 --- Iter [260/2000] ---  
 Total Loss: 3870.5935  
 MSE Component: 3.8371 (Weighted: 3837.1246)  
 NLL Component: 33.3809  
 Min Variance: 2.90e-06  
 p1=0.256, p2=0.233  
  
 --- Validation at iteration 260 ---  
 Average MSE: 304.1767, Average ANEES: 382.3135

---

--- Iter [261/2000] ---  
 Total Loss: 4691.4268  
 MSE Component: 4.6701 (Weighted: 4670.1365)  
 NLL Component: 21.2028  
 Min Variance: 8.09e-06  
 p1=0.256, p2=0.233  
 --- Iter [262/2000] ---  
 Total Loss: 4243.1904  
 MSE Component: 4.2171 (Weighted: 4217.1183)  
 NLL Component: 25.9845  
 Min Variance: 5.24e-06  
 p1=0.256, p2=0.233  
 --- Iter [263/2000] ---  
 Total Loss: 4484.0444  
 MSE Component: 4.4661 (Weighted: 4466.0730)  
 NLL Component: 17.8835  
 Min Variance: 1.23e-05  
 p1=0.256, p2=0.233  
 --- Iter [264/2000] ---  
 Total Loss: 3918.4238  
 MSE Component: 3.8966 (Weighted: 3896.6255)  
 NLL Component: 21.7103

```

Min Variance: 1.29e-06
p1=0.256, p2=0.233
--- Iter [265/2000] ---
Total Loss: 4465.9619
MSE Component: 4.4446 (Weighted: 4444.6349)
NLL Component: 21.2395
Min Variance: 6.24e-06
p1=0.256, p2=0.233
--- Iter [266/2000] ---
Total Loss: 4490.3657
MSE Component: 4.4707 (Weighted: 4470.6998)
NLL Component: 19.5780
Min Variance: 7.40e-06
p1=0.256, p2=0.233
--- Iter [267/2000] ---
Total Loss: 4897.2754
MSE Component: 4.8699 (Weighted: 4869.8616)
NLL Component: 27.3258
Min Variance: 7.97e-06
p1=0.256, p2=0.233
--- Iter [268/2000] ---
Total Loss: 4978.6113
MSE Component: 4.9528 (Weighted: 4952.7507)
NLL Component: 25.7730
Min Variance: 3.28e-06
p1=0.256, p2=0.233
--- Iter [269/2000] ---
Total Loss: 3608.6453
MSE Component: 3.5861 (Weighted: 3586.0913)
NLL Component: 22.4658
Min Variance: 1.11e-05
p1=0.256, p2=0.233
--- Iter [270/2000] ---
Total Loss: 5467.6855
MSE Component: 5.4370 (Weighted: 5437.0475)
NLL Component: 30.5503
Min Variance: 5.53e-06
p1=0.256, p2=0.233

--- Validation at iteration 270 ---
Average MSE: 305.6080, Average ANEES: 545.4064
-----
--- Iter [271/2000] ---
Total Loss: 3990.7859
MSE Component: 3.9674 (Weighted: 3967.4308)
NLL Component: 23.2669
Min Variance: 7.46e-06
p1=0.256, p2=0.233

```

```
--- Iter [272/2000] ---
Total Loss: 5054.5347
MSE Component: 5.0317 (Weighted: 5031.7025)
NLL Component: 22.7442
Min Variance: 4.08e-06
p1=0.256, p2=0.233
--- Iter [273/2000] ---
Total Loss: 5906.3418
MSE Component: 5.8840 (Weighted: 5884.0146)
NLL Component: 22.2395
Min Variance: 1.64e-05
p1=0.256, p2=0.233
--- Iter [274/2000] ---
Total Loss: 3914.6379
MSE Component: 3.8915 (Weighted: 3891.5470)
NLL Component: 23.0029
Min Variance: 8.08e-06
p1=0.256, p2=0.233
--- Iter [275/2000] ---
Total Loss: 4165.5615
MSE Component: 4.1328 (Weighted: 4132.7524)
NLL Component: 32.7211
Min Variance: 4.41e-06
p1=0.256, p2=0.233
--- Iter [276/2000] ---
Total Loss: 4340.3384
MSE Component: 4.3204 (Weighted: 4320.3611)
NLL Component: 19.8891
Min Variance: 1.31e-05
p1=0.256, p2=0.233
--- Iter [277/2000] ---
Total Loss: 5765.6968
MSE Component: 5.7444 (Weighted: 5744.4305)
NLL Component: 21.1782
Min Variance: 1.13e-05
p1=0.256, p2=0.233
--- Iter [278/2000] ---
Total Loss: 7788.5874
MSE Component: 7.7678 (Weighted: 7767.7650)
NLL Component: 20.7343
Min Variance: 5.70e-06
p1=0.256, p2=0.233
--- Iter [279/2000] ---
Total Loss: 5353.3027
MSE Component: 5.3298 (Weighted: 5329.8025)
NLL Component: 23.4123
Min Variance: 6.15e-06
p1=0.256, p2=0.233
```

```
--- Iter [280/2000] ---
Total Loss: 3423.0051
MSE Component: 3.3983 (Weighted: 3398.2737)
NLL Component: 24.6433
Min Variance: 3.29e-06
p1=0.256, p2=0.233

--- Validation at iteration 280 ---
Average MSE: 289.0058, Average ANEES: 428.8951
-----

--- Iter [281/2000] ---
Total Loss: 6566.3062
MSE Component: 6.5354 (Weighted: 6535.4214)
NLL Component: 30.7970
Min Variance: 4.81e-06
p1=0.256, p2=0.233
--- Iter [282/2000] ---
Total Loss: 13900.4785
MSE Component: 13.8772 (Weighted: 13877.1696)
NLL Component: 23.2209
Min Variance: 9.79e-06
p1=0.256, p2=0.233
--- Iter [283/2000] ---
Total Loss: 11622.1689
MSE Component: 11.5895 (Weighted: 11589.4814)
NLL Component: 32.5994
Min Variance: 4.27e-06
p1=0.256, p2=0.233
--- Iter [284/2000] ---
Total Loss: 10153.3770
MSE Component: 10.1248 (Weighted: 10124.7702)
NLL Component: 28.5189
Min Variance: 6.89e-06
p1=0.256, p2=0.233
--- Iter [285/2000] ---
Total Loss: 13030.1934
MSE Component: 13.0001 (Weighted: 13000.0973)
NLL Component: 30.0080
Min Variance: 5.24e-06
p1=0.256, p2=0.233
--- Iter [286/2000] ---
Total Loss: 6137.9014
MSE Component: 6.1118 (Weighted: 6111.7725)
NLL Component: 26.0408
Min Variance: 1.00e-05
p1=0.256, p2=0.233
--- Iter [287/2000] ---
Total Loss: 3883.5615
```

```

MSE Component: 3.8518 (Weighted: 3851.7792)
NLL Component: 31.6940
Min Variance: 3.77e-06
p1=0.256, p2=0.233
--- Iter [288/2000] ---
Total Loss: 12501.1748
MSE Component: 12.4784 (Weighted: 12478.3850)
NLL Component: 22.7017
Min Variance: 3.38e-06
p1=0.256, p2=0.233
--- Iter [289/2000] ---
Total Loss: 23711.1641
MSE Component: 23.6955 (Weighted: 23695.4918)
NLL Component: 15.5839
Min Variance: 9.58e-06
p1=0.256, p2=0.233
--- Iter [290/2000] ---
Total Loss: 18698.0879
MSE Component: 18.6793 (Weighted: 18679.3175)
NLL Component: 18.6818
Min Variance: 2.03e-06
p1=0.256, p2=0.233

--- Validation at iteration 290 ---
Average MSE: 437.6534, Average ANEES: 271.2888
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [291/2000] ---
Total Loss: 28920.1719
MSE Component: 28.8968 (Weighted: 28896.7686)
NLL Component: 23.3143
Min Variance: 1.70e-06
p1=0.256, p2=0.233
--- Iter [292/2000] ---
Total Loss: 25789.7676
MSE Component: 25.7685 (Weighted: 25768.4860)
NLL Component: 21.1928
Min Variance: 6.05e-06
p1=0.256, p2=0.233
--- Iter [293/2000] ---
Total Loss: 22908.2207
MSE Component: 22.8907 (Weighted: 22890.6841)
NLL Component: 17.4494
Min Variance: 1.19e-05
p1=0.256, p2=0.233
--- Iter [294/2000] ---
Total Loss: 24477.6934
MSE Component: 24.4576 (Weighted: 24457.6397)

```

NLL Component: 19.9650  
Min Variance: 8.64e-06  
p1=0.256, p2=0.233  
--- Iter [295/2000] ---  
Total Loss: 10079.9502  
MSE Component: 10.0588 (Weighted: 10058.8140)  
NLL Component: 21.0481  
Min Variance: 6.76e-06  
p1=0.256, p2=0.233  
--- Iter [296/2000] ---  
Total Loss: 3731.4807  
MSE Component: 3.7075 (Weighted: 3707.5095)  
NLL Component: 23.8831  
Min Variance: 1.10e-05  
p1=0.256, p2=0.233  
--- Iter [297/2000] ---  
Total Loss: 6833.5947  
MSE Component: 6.8052 (Weighted: 6805.1705)  
NLL Component: 28.3364  
Min Variance: 9.74e-06  
p1=0.256, p2=0.233  
--- Iter [298/2000] ---  
Total Loss: 11395.4404  
MSE Component: 11.3655 (Weighted: 11365.5205)  
NLL Component: 29.8318  
Min Variance: 2.16e-06  
p1=0.256, p2=0.233  
--- Iter [299/2000] ---  
Total Loss: 8893.9883  
MSE Component: 8.8540 (Weighted: 8853.9505)  
NLL Component: 39.9506  
Min Variance: 5.12e-06  
p1=0.256, p2=0.233  
--- Iter [300/2000] ---  
Total Loss: 28416.2930  
MSE Component: 28.3834 (Weighted: 28383.4114)  
NLL Component: 32.7924  
Min Variance: 1.74e-05  
p1=0.256, p2=0.233

--- Validation at iteration 300 ---  
Average MSE: 299.7411, Average ANEES: 429.1583

---

--- Iter [301/2000] ---  
Total Loss: 22088.0234  
MSE Component: 22.0568 (Weighted: 22056.8485)  
NLL Component: 31.0869  
Min Variance: 4.82e-06

p1=0.256, p2=0.233  
--- Iter [302/2000] ---  
Total Loss: 10424.7861  
MSE Component: 10.3893 (Weighted: 10389.2746)  
NLL Component: 35.4236  
Min Variance: 5.35e-06  
p1=0.256, p2=0.233  
--- Iter [303/2000] ---  
Total Loss: 10831.4561  
MSE Component: 10.7981 (Weighted: 10798.0852)  
NLL Component: 33.2833  
Min Variance: 1.82e-06  
p1=0.256, p2=0.233  
--- Iter [304/2000] ---  
Total Loss: 8414.9404  
MSE Component: 8.3904 (Weighted: 8390.3723)  
NLL Component: 24.4800  
Min Variance: 1.19e-05  
p1=0.256, p2=0.233  
--- Iter [305/2000] ---  
Total Loss: 4968.5488  
MSE Component: 4.9504 (Weighted: 4950.4275)  
NLL Component: 18.0333  
Min Variance: 2.70e-06  
p1=0.256, p2=0.233  
--- Iter [306/2000] ---  
Total Loss: 8302.0244  
MSE Component: 8.2836 (Weighted: 8283.5712)  
NLL Component: 18.3653  
Min Variance: 4.53e-06  
p1=0.256, p2=0.233  
--- Iter [307/2000] ---  
Total Loss: 9887.0752  
MSE Component: 9.8730 (Weighted: 9872.9582)  
NLL Component: 14.0296  
Min Variance: 4.80e-06  
p1=0.256, p2=0.233  
--- Iter [308/2000] ---  
Total Loss: 22896.1914  
MSE Component: 22.8813 (Weighted: 22881.3419)  
NLL Component: 14.7625  
Min Variance: 8.18e-06  
p1=0.256, p2=0.233  
--- Iter [309/2000] ---  
Total Loss: 24282.8379  
MSE Component: 24.2685 (Weighted: 24268.4841)  
NLL Component: 14.2657  
Min Variance: 1.47e-05

```

p1=0.256, p2=0.233
--- Iter [310/2000] ---
Total Loss: 17942.3848
MSE Component: 17.9260 (Weighted: 17926.0254)
NLL Component: 16.2710
Min Variance: 1.13e-05
p1=0.256, p2=0.233

--- Validation at iteration 310 ---
Average MSE: 386.1080, Average ANEES: 243.1124
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [311/2000] ---
Total Loss: 9945.3428
MSE Component: 9.9298 (Weighted: 9929.7943)
NLL Component: 15.4610
Min Variance: 1.01e-05
p1=0.256, p2=0.233
--- Iter [312/2000] ---
Total Loss: 4778.3467
MSE Component: 4.7585 (Weighted: 4758.5120)
NLL Component: 19.7467
Min Variance: 1.75e-06
p1=0.256, p2=0.233
--- Iter [313/2000] ---
Total Loss: 4540.2183
MSE Component: 4.5221 (Weighted: 4522.0933)
NLL Component: 18.0370
Min Variance: 1.05e-05
p1=0.256, p2=0.233
--- Iter [314/2000] ---
Total Loss: 6520.6689
MSE Component: 6.5018 (Weighted: 6501.7638)
NLL Component: 18.8173
Min Variance: 1.79e-05
p1=0.256, p2=0.233
--- Iter [315/2000] ---
Total Loss: 7290.2017
MSE Component: 7.2643 (Weighted: 7264.3027)
NLL Component: 25.8109
Min Variance: 9.47e-06
p1=0.256, p2=0.233
--- Iter [316/2000] ---
Total Loss: 12204.9023
MSE Component: 12.1733 (Weighted: 12173.2988)
NLL Component: 31.5155
Min Variance: 8.44e-06
p1=0.256, p2=0.233

```

```
--- Iter [317/2000] ---
Total Loss: 11436.7363
MSE Component: 11.4042 (Weighted: 11404.1948)
NLL Component: 32.4534
Min Variance: 1.82e-06
p1=0.256, p2=0.233
--- Iter [318/2000] ---
Total Loss: 18088.8770
MSE Component: 18.0547 (Weighted: 18054.6684)
NLL Component: 34.1220
Min Variance: 9.45e-06
p1=0.256, p2=0.233
--- Iter [319/2000] ---
Total Loss: 10805.7803
MSE Component: 10.7704 (Weighted: 10770.4020)
NLL Component: 35.2904
Min Variance: 7.19e-06
p1=0.256, p2=0.233
--- Iter [320/2000] ---
Total Loss: 17968.2656
MSE Component: 17.9386 (Weighted: 17938.5910)
NLL Component: 29.5869
Min Variance: 3.57e-06
p1=0.256, p2=0.233

--- Validation at iteration 320 ---
Average MSE: 458.8394, Average ANEES: 322.7441
-----
--- Iter [321/2000] ---
Total Loss: 12269.7705
MSE Component: 12.2398 (Weighted: 12239.7795)
NLL Component: 29.9038
Min Variance: 6.03e-06
p1=0.256, p2=0.233
--- Iter [322/2000] ---
Total Loss: 13826.0703
MSE Component: 13.7919 (Weighted: 13791.8549)
NLL Component: 34.1276
Min Variance: 8.67e-06
p1=0.256, p2=0.233
--- Iter [323/2000] ---
Total Loss: 14536.4570
MSE Component: 14.5091 (Weighted: 14509.1267)
NLL Component: 27.2422
Min Variance: 1.11e-05
p1=0.256, p2=0.233
--- Iter [324/2000] ---
Total Loss: 7320.8037
```

MSE Component: 7.2949 (Weighted: 7294.8666)  
NLL Component: 25.8492  
Min Variance: 2.49e-06  
p1=0.256, p2=0.233  
--- Iter [325/2000] ---  
Total Loss: 11930.0264  
MSE Component: 11.9041 (Weighted: 11904.0546)  
NLL Component: 25.8838  
Min Variance: 7.97e-06  
p1=0.256, p2=0.233  
--- Iter [326/2000] ---  
Total Loss: 5527.7905  
MSE Component: 5.5044 (Weighted: 5504.4441)  
NLL Component: 23.2584  
Min Variance: 3.73e-06  
p1=0.256, p2=0.233  
--- Iter [327/2000] ---  
Total Loss: 5449.0410  
MSE Component: 5.4170 (Weighted: 5417.0365)  
NLL Component: 31.9165  
Min Variance: 6.01e-06  
p1=0.256, p2=0.233  
--- Iter [328/2000] ---  
Total Loss: 14104.4902  
MSE Component: 14.0799 (Weighted: 14079.8626)  
NLL Component: 24.5405  
Min Variance: 8.88e-06  
p1=0.256, p2=0.233  
--- Iter [329/2000] ---  
Total Loss: 12617.6523  
MSE Component: 12.5934 (Weighted: 12593.4410)  
NLL Component: 24.1234  
Min Variance: 1.15e-05  
p1=0.256, p2=0.233  
--- Iter [330/2000] ---  
Total Loss: 11602.6709  
MSE Component: 11.5773 (Weighted: 11577.3048)  
NLL Component: 25.2788  
Min Variance: 9.20e-06  
p1=0.256, p2=0.233  
  
--- Validation at iteration 330 ---  
Average MSE: 324.6032, Average ANEES: 527.2002

---

--- Iter [331/2000] ---  
Total Loss: 6879.3032  
MSE Component: 6.8546 (Weighted: 6854.6262)  
NLL Component: 24.5891

Min Variance: 1.30e-05  
p1=0.256, p2=0.233  
--- Iter [332/2000] ---  
Total Loss: 14937.7188  
MSE Component: 14.9153 (Weighted: 14915.2632)  
NLL Component: 22.3685  
Min Variance: 7.06e-06  
p1=0.256, p2=0.233  
--- Iter [333/2000] ---  
Total Loss: 8609.4658  
MSE Component: 8.5875 (Weighted: 8587.4596)  
NLL Component: 21.9183  
Min Variance: 1.78e-06  
p1=0.256, p2=0.233  
--- Iter [334/2000] ---  
Total Loss: 6818.7734  
MSE Component: 6.8010 (Weighted: 6801.0302)  
NLL Component: 17.6554  
Min Variance: 8.44e-06  
p1=0.256, p2=0.233  
--- Iter [335/2000] ---  
Total Loss: 4888.2939  
MSE Component: 4.8676 (Weighted: 4867.5594)  
NLL Component: 20.6463  
Min Variance: 1.44e-05  
p1=0.256, p2=0.233  
--- Iter [336/2000] ---  
Total Loss: 5531.7246  
MSE Component: 5.5093 (Weighted: 5509.2583)  
NLL Component: 22.3782  
Min Variance: 1.68e-05  
p1=0.256, p2=0.233  
--- Iter [337/2000] ---  
Total Loss: 7774.6279  
MSE Component: 7.7586 (Weighted: 7758.6069)  
NLL Component: 15.9331  
Min Variance: 5.52e-06  
p1=0.256, p2=0.233  
--- Iter [338/2000] ---  
Total Loss: 7615.5029  
MSE Component: 7.5988 (Weighted: 7598.8145)  
NLL Component: 16.6007  
Min Variance: 7.68e-06  
p1=0.256, p2=0.233  
--- Iter [339/2000] ---  
Total Loss: 8280.7480  
MSE Component: 8.2610 (Weighted: 8261.0073)  
NLL Component: 19.6534

```

Min Variance: 1.10e-05
p1=0.256, p2=0.233
--- Iter [340/2000] ---
Total Loss: 5116.0762
MSE Component: 5.0979 (Weighted: 5097.9466)
NLL Component: 18.0415
Min Variance: 1.27e-05
p1=0.256, p2=0.233

--- Validation at iteration 340 ---
Average MSE: 444.3239, Average ANEES: 367.4643
-----
--- Iter [341/2000] ---
Total Loss: 6539.0864
MSE Component: 6.5233 (Weighted: 6523.3355)
NLL Component: 15.6629
Min Variance: 1.30e-05
p1=0.256, p2=0.233
--- Iter [342/2000] ---
Total Loss: 3252.5620
MSE Component: 3.2231 (Weighted: 3223.1410)
NLL Component: 29.3332
Min Variance: 5.52e-06
p1=0.256, p2=0.233
--- Iter [343/2000] ---
Total Loss: 4890.3765
MSE Component: 4.8727 (Weighted: 4872.7202)
NLL Component: 17.5685
Min Variance: 1.21e-05
p1=0.256, p2=0.233
--- Iter [344/2000] ---
Total Loss: 4508.5220
MSE Component: 4.4858 (Weighted: 4485.8112)
NLL Component: 22.6229
Min Variance: 2.08e-06
p1=0.256, p2=0.233
--- Iter [345/2000] ---
Total Loss: 5312.3618
MSE Component: 5.2903 (Weighted: 5290.2741)
NLL Component: 22.0002
Min Variance: 5.26e-06
p1=0.256, p2=0.233
--- Iter [346/2000] ---
Total Loss: 5071.9194
MSE Component: 5.0548 (Weighted: 5054.8277)
NLL Component: 17.0039
Min Variance: 5.75e-06
p1=0.256, p2=0.233

```

```
--- Iter [347/2000] ---
Total Loss: 4757.2642
MSE Component: 4.7333 (Weighted: 4733.3193)
NLL Component: 23.8568
Min Variance: 1.02e-05
p1=0.256, p2=0.232
--- Iter [348/2000] ---
Total Loss: 4993.7222
MSE Component: 4.9641 (Weighted: 4964.1161)
NLL Component: 29.5181
Min Variance: 4.12e-06
p1=0.256, p2=0.232
--- Iter [349/2000] ---
Total Loss: 5722.4185
MSE Component: 5.7010 (Weighted: 5700.9749)
NLL Component: 21.3555
Min Variance: 4.06e-06
p1=0.256, p2=0.232
--- Iter [350/2000] ---
Total Loss: 4490.1709
MSE Component: 4.4703 (Weighted: 4470.3007)
NLL Component: 19.7824
Min Variance: 8.38e-06
p1=0.256, p2=0.232

--- Validation at iteration 350 ---
Average MSE: 448.6884, Average ANEES: 357.1410
-----
--- Iter [351/2000] ---
Total Loss: 5432.6812
MSE Component: 5.4132 (Weighted: 5413.2018)
NLL Component: 19.3914
Min Variance: 5.69e-06
p1=0.256, p2=0.232
--- Iter [352/2000] ---
Total Loss: 4690.2812
MSE Component: 4.6714 (Weighted: 4671.3824)
NLL Component: 18.8110
Min Variance: 4.98e-06
p1=0.256, p2=0.232
--- Iter [353/2000] ---
Total Loss: 4066.4939
MSE Component: 4.0485 (Weighted: 4048.4967)
NLL Component: 17.9093
Min Variance: 8.71e-06
p1=0.256, p2=0.232
--- Iter [354/2000] ---
Total Loss: 4678.6421
```

MSE Component: 4.6587 (Weighted: 4658.7219)  
NLL Component: 19.8326  
Min Variance: 7.72e-06  
p1=0.256, p2=0.232  
--- Iter [355/2000] ---  
Total Loss: 5178.9097  
MSE Component: 5.1546 (Weighted: 5154.6478)  
NLL Component: 24.1741  
Min Variance: 5.58e-06  
p1=0.256, p2=0.232  
--- Iter [356/2000] ---  
Total Loss: 4268.2588  
MSE Component: 4.2403 (Weighted: 4240.2506)  
NLL Component: 27.9205  
Min Variance: 1.61e-06  
p1=0.256, p2=0.232  
--- Iter [357/2000] ---  
Total Loss: 4087.7756  
MSE Component: 4.0667 (Weighted: 4066.7267)  
NLL Component: 20.9613  
Min Variance: 6.02e-06  
p1=0.256, p2=0.232  
--- Iter [358/2000] ---  
Total Loss: 3387.8223  
MSE Component: 3.3701 (Weighted: 3370.1246)  
NLL Component: 17.6099  
Min Variance: 7.19e-06  
p1=0.256, p2=0.232  
--- Iter [359/2000] ---  
Total Loss: 3853.2332  
MSE Component: 3.8348 (Weighted: 3834.7571)  
NLL Component: 18.3882  
Min Variance: 4.16e-06  
p1=0.256, p2=0.232  
--- Iter [360/2000] ---  
Total Loss: 3037.8079  
MSE Component: 3.0175 (Weighted: 3017.4859)  
NLL Component: 20.2342  
Min Variance: 3.09e-06  
p1=0.256, p2=0.232  
  
--- Validation at iteration 360 ---  
Average MSE: 336.9840, Average ANEES: 466.1041

---

--- Iter [361/2000] ---  
Total Loss: 6101.7476  
MSE Component: 6.0823 (Weighted: 6082.3269)  
NLL Component: 19.3331

Min Variance: 7.42e-06  
p1=0.256, p2=0.232  
--- Iter [362/2000] ---  
Total Loss: 4314.7227  
MSE Component: 4.2913 (Weighted: 4291.2779)  
NLL Component: 23.3570  
Min Variance: 1.16e-05  
p1=0.256, p2=0.232  
--- Iter [363/2000] ---  
Total Loss: 4489.3984  
MSE Component: 4.4676 (Weighted: 4467.5565)  
NLL Component: 21.7538  
Min Variance: 5.32e-06  
p1=0.256, p2=0.232  
--- Iter [364/2000] ---  
Total Loss: 3652.8674  
MSE Component: 3.6310 (Weighted: 3631.0389)  
NLL Component: 21.7406  
Min Variance: 6.22e-06  
p1=0.256, p2=0.232  
--- Iter [365/2000] ---  
Total Loss: 4873.7119  
MSE Component: 4.8532 (Weighted: 4853.2281)  
NLL Component: 20.3961  
Min Variance: 7.70e-06  
p1=0.256, p2=0.232  
--- Iter [366/2000] ---  
Total Loss: 4960.2246  
MSE Component: 4.9408 (Weighted: 4940.8379)  
NLL Component: 19.2986  
Min Variance: 1.19e-05  
p1=0.256, p2=0.232  
--- Iter [367/2000] ---  
Total Loss: 5972.8823  
MSE Component: 5.9484 (Weighted: 5948.3929)  
NLL Component: 24.4016  
Min Variance: 4.03e-06  
p1=0.256, p2=0.232  
--- Iter [368/2000] ---  
Total Loss: 5131.8579  
MSE Component: 5.1137 (Weighted: 5113.6718)  
NLL Component: 18.0983  
Min Variance: 7.98e-06  
p1=0.256, p2=0.232  
--- Iter [369/2000] ---  
Total Loss: 4926.2773  
MSE Component: 4.9025 (Weighted: 4902.5054)  
NLL Component: 23.6843

```
Min Variance: 6.82e-06
p1=0.256, p2=0.232
--- Iter [370/2000] ---
Total Loss: 4617.9937
MSE Component: 4.5990 (Weighted: 4598.9900)
NLL Component: 18.9162
Min Variance: 2.30e-06
p1=0.256, p2=0.232

--- Validation at iteration 370 ---
Average MSE: 377.2398, Average ANEES: 386.4608
-----
--- Iter [371/2000] ---
Total Loss: 5126.9443
MSE Component: 5.1056 (Weighted: 5105.5899)
NLL Component: 21.2667
Min Variance: 9.85e-06
p1=0.256, p2=0.232
--- Iter [372/2000] ---
Total Loss: 5451.1235
MSE Component: 5.4229 (Weighted: 5422.9450)
NLL Component: 28.0906
Min Variance: 8.18e-06
p1=0.256, p2=0.232
--- Iter [373/2000] ---
Total Loss: 5396.8408
MSE Component: 5.3737 (Weighted: 5373.7478)
NLL Component: 23.0047
Min Variance: 8.98e-06
p1=0.256, p2=0.232
--- Iter [374/2000] ---
Total Loss: 5326.7827
MSE Component: 5.3056 (Weighted: 5305.6417)
NLL Component: 21.0533
Min Variance: 2.43e-06
p1=0.256, p2=0.232
--- Iter [375/2000] ---
Total Loss: 6263.6372
MSE Component: 6.2354 (Weighted: 6235.3501)
NLL Component: 28.1992
Min Variance: 4.81e-06
p1=0.256, p2=0.232
--- Iter [376/2000] ---
Total Loss: 5407.8643
MSE Component: 5.3873 (Weighted: 5387.2752)
NLL Component: 20.5008
Min Variance: 5.97e-06
p1=0.256, p2=0.232
```

```
--- Iter [377/2000] ---
Total Loss: 3616.1792
MSE Component: 3.5894 (Weighted: 3589.3793)
NLL Component: 26.7120
Min Variance: 6.91e-06
p1=0.256, p2=0.232
--- Iter [378/2000] ---
Total Loss: 2966.7285
MSE Component: 2.9491 (Weighted: 2949.1181)
NLL Component: 17.5225
Min Variance: 1.20e-05
p1=0.256, p2=0.232
--- Iter [379/2000] ---
Total Loss: 3770.9355
MSE Component: 3.7446 (Weighted: 3744.6201)
NLL Component: 26.2275
Min Variance: 4.91e-06
p1=0.256, p2=0.232
--- Iter [380/2000] ---
Total Loss: 6814.6323
MSE Component: 6.7896 (Weighted: 6789.5656)
NLL Component: 24.9792
Min Variance: 5.71e-06
p1=0.256, p2=0.232

--- Validation at iteration 380 ---
Average MSE: 414.7470, Average ANEES: 270.3542
-----
--- Iter [381/2000] ---
Total Loss: 10446.0303
MSE Component: 10.4255 (Weighted: 10425.5066)
NLL Component: 20.4358
Min Variance: 1.37e-05
p1=0.256, p2=0.232
--- Iter [382/2000] ---
Total Loss: 9274.0078
MSE Component: 9.2560 (Weighted: 9255.9614)
NLL Component: 17.9589
Min Variance: 3.16e-06
p1=0.256, p2=0.232
--- Iter [383/2000] ---
Total Loss: 4805.4619
MSE Component: 4.7843 (Weighted: 4784.3323)
NLL Component: 21.0420
Min Variance: 1.83e-06
p1=0.256, p2=0.232
--- Iter [384/2000] ---
Total Loss: 2927.8726
```

MSE Component: 2.9085 (Weighted: 2908.5429)  
NLL Component: 19.2417  
Min Variance: 1.27e-05  
p1=0.256, p2=0.232  
--- Iter [385/2000] ---  
Total Loss: 3688.5640  
MSE Component: 3.6685 (Weighted: 3668.5224)  
NLL Component: 19.9536  
Min Variance: 5.45e-06  
p1=0.256, p2=0.232  
--- Iter [386/2000] ---  
Total Loss: 4513.1943  
MSE Component: 4.4924 (Weighted: 4492.3592)  
NLL Component: 20.7472  
Min Variance: 4.68e-06  
p1=0.256, p2=0.232  
--- Iter [387/2000] ---  
Total Loss: 4643.1299  
MSE Component: 4.6140 (Weighted: 4614.0308)  
NLL Component: 29.0113  
Min Variance: 7.51e-06  
p1=0.256, p2=0.232  
--- Iter [388/2000] ---  
Total Loss: 4272.7734  
MSE Component: 4.2507 (Weighted: 4250.6986)  
NLL Component: 21.9870  
Min Variance: 6.50e-06  
p1=0.256, p2=0.232  
--- Iter [389/2000] ---  
Total Loss: 4819.6494  
MSE Component: 4.7940 (Weighted: 4794.0450)  
NLL Component: 25.5168  
Min Variance: 5.04e-06  
p1=0.256, p2=0.232  
--- Iter [390/2000] ---  
Total Loss: 7197.6123  
MSE Component: 7.1761 (Weighted: 7176.1255)  
NLL Component: 21.3989  
Min Variance: 2.66e-06  
p1=0.256, p2=0.232  
  
--- Validation at iteration 390 ---  
Average MSE: 330.0077, Average ANEES: 348.5330

---

--- Iter [391/2000] ---  
Total Loss: 5214.5918  
MSE Component: 5.1890 (Weighted: 5188.9668)  
NLL Component: 25.5370

Min Variance: 1.21e-05  
p1=0.256, p2=0.232  
--- Iter [392/2000] ---  
Total Loss: 4847.8530  
MSE Component: 4.8328 (Weighted: 4832.7565)  
NLL Component: 15.0088  
Min Variance: 8.82e-06  
p1=0.256, p2=0.232  
--- Iter [393/2000] ---  
Total Loss: 2845.6140  
MSE Component: 2.8202 (Weighted: 2820.1816)  
NLL Component: 25.3446  
Min Variance: 5.60e-06  
p1=0.256, p2=0.232  
--- Iter [394/2000] ---  
Total Loss: 3357.9932  
MSE Component: 3.3328 (Weighted: 3332.7646)  
NLL Component: 25.1406  
Min Variance: 5.54e-06  
p1=0.256, p2=0.232  
--- Iter [395/2000] ---  
Total Loss: 4646.2256  
MSE Component: 4.6282 (Weighted: 4628.2387)  
NLL Component: 17.8987  
Min Variance: 3.97e-06  
p1=0.256, p2=0.232  
--- Iter [396/2000] ---  
Total Loss: 5158.1108  
MSE Component: 5.1409 (Weighted: 5140.9278)  
NLL Component: 17.0953  
Min Variance: 1.42e-05  
p1=0.256, p2=0.232  
--- Iter [397/2000] ---  
Total Loss: 5181.0542  
MSE Component: 5.1545 (Weighted: 5154.5415)  
NLL Component: 26.4247  
Min Variance: 4.73e-06  
p1=0.256, p2=0.232  
--- Iter [398/2000] ---  
Total Loss: 3799.4727  
MSE Component: 3.7787 (Weighted: 3778.6806)  
NLL Component: 20.7042  
Min Variance: 2.48e-06  
p1=0.256, p2=0.232  
--- Iter [399/2000] ---  
Total Loss: 4157.1577  
MSE Component: 4.1269 (Weighted: 4126.9469)  
NLL Component: 30.1230

```

Min Variance: 4.96e-06
p1=0.256, p2=0.232
--- Iter [400/2000] ---
Total Loss: 3633.0833
MSE Component: 3.6038 (Weighted: 3603.8127)
NLL Component: 29.1825
Min Variance: 2.81e-06
p1=0.256, p2=0.232

--- Validation at iteration 400 ---
Average MSE: 335.5289, Average ANEES: 463.3801
-----
--- Iter [401/2000] ---
Total Loss: 4001.0181
MSE Component: 3.9783 (Weighted: 3978.3478)
NLL Component: 22.5825
Min Variance: 1.08e-05
p1=0.256, p2=0.232
--- Iter [402/2000] ---
Total Loss: 3515.1411
MSE Component: 3.4924 (Weighted: 3492.3608)
NLL Component: 22.6924
Min Variance: 3.09e-06
p1=0.256, p2=0.232
--- Iter [403/2000] ---
Total Loss: 3578.9094
MSE Component: 3.5543 (Weighted: 3554.3156)
NLL Component: 24.5059
Min Variance: 4.76e-06
p1=0.256, p2=0.232
--- Iter [404/2000] ---
Total Loss: 2852.0767
MSE Component: 2.8298 (Weighted: 2829.8445)
NLL Component: 22.1444
Min Variance: 4.54e-06
p1=0.256, p2=0.232
--- Iter [405/2000] ---
Total Loss: 5448.1343
MSE Component: 5.4260 (Weighted: 5425.9701)
NLL Component: 22.0761
Min Variance: 9.10e-06
p1=0.256, p2=0.232
--- Iter [406/2000] ---
Total Loss: 5579.2979
MSE Component: 5.5554 (Weighted: 5555.3751)
NLL Component: 23.8352
Min Variance: 9.22e-06
p1=0.256, p2=0.232

```

```

--- Iter [407/2000] ---
Total Loss: 7705.5376
MSE Component: 7.6889 (Weighted: 7688.9172)
NLL Component: 16.5327
Min Variance: 7.62e-06
p1=0.256, p2=0.232
--- Iter [408/2000] ---
Total Loss: 6761.6367
MSE Component: 6.7413 (Weighted: 6741.2963)
NLL Component: 20.2527
Min Variance: 5.27e-06
p1=0.256, p2=0.232
--- Iter [409/2000] ---
Total Loss: 4637.2231
MSE Component: 4.6116 (Weighted: 4611.5808)
NLL Component: 25.5542
Min Variance: 4.02e-06
p1=0.256, p2=0.232
--- Iter [410/2000] ---
Total Loss: 3723.9673
MSE Component: 3.6989 (Weighted: 3698.8592)
NLL Component: 25.0202
Min Variance: 5.82e-06
p1=0.256, p2=0.232

--- Validation at iteration 410 ---
Average MSE: 323.5175, Average ANEES: 432.6911
-----
--- Iter [411/2000] ---
Total Loss: 3487.8718
MSE Component: 3.4665 (Weighted: 3466.4936)
NLL Component: 21.2904
Min Variance: 3.24e-06
p1=0.256, p2=0.232
--- Iter [412/2000] ---
Total Loss: 4346.8940
MSE Component: 4.3153 (Weighted: 4315.3458)
NLL Component: 31.4606
Min Variance: 2.53e-06
p1=0.256, p2=0.232
--- Iter [413/2000] ---
Total Loss: 3875.2627
MSE Component: 3.8513 (Weighted: 3851.3081)
NLL Component: 23.8667
Min Variance: 2.04e-06
p1=0.256, p2=0.232
--- Iter [414/2000] ---
Total Loss: 4768.1157

```

MSE Component: 4.7456 (Weighted: 4745.5983)  
NLL Component: 22.4299  
Min Variance: 5.12e-06  
p1=0.256, p2=0.232  
--- Iter [415/2000] ---  
Total Loss: 3956.1472  
MSE Component: 3.9343 (Weighted: 3934.3486)  
NLL Component: 21.7107  
Min Variance: 6.60e-06  
p1=0.256, p2=0.232  
--- Iter [416/2000] ---  
Total Loss: 2693.6084  
MSE Component: 2.6763 (Weighted: 2676.3124)  
NLL Component: 17.2079  
Min Variance: 1.38e-06  
p1=0.256, p2=0.232  
--- Iter [417/2000] ---  
Total Loss: 3586.0029  
MSE Component: 3.5609 (Weighted: 3560.9417)  
NLL Component: 24.9733  
Min Variance: 3.65e-06  
p1=0.256, p2=0.232  
--- Iter [418/2000] ---  
Total Loss: 3334.4434  
MSE Component: 3.3167 (Weighted: 3316.6504)  
NLL Component: 17.7051  
Min Variance: 4.59e-06  
p1=0.256, p2=0.232  
--- Iter [419/2000] ---  
Total Loss: 3970.6877  
MSE Component: 3.9489 (Weighted: 3948.9300)  
NLL Component: 21.6699  
Min Variance: 5.47e-06  
p1=0.256, p2=0.232  
--- Iter [420/2000] ---  
Total Loss: 3974.7515  
MSE Component: 3.9466 (Weighted: 3946.6243)  
NLL Component: 28.0394  
Min Variance: 3.15e-06  
p1=0.256, p2=0.232  
  
--- Validation at iteration 420 ---  
Average MSE: 361.9234, Average ANEES: 336.7747

---

--- Iter [421/2000] ---  
Total Loss: 3961.4036  
MSE Component: 3.9459 (Weighted: 3945.8680)  
NLL Component: 15.4478

Min Variance: 4.13e-06  
p1=0.256, p2=0.232  
--- Iter [422/2000] ---  
Total Loss: 3551.3389  
MSE Component: 3.5278 (Weighted: 3527.7648)  
NLL Component: 23.4860  
Min Variance: 2.82e-06  
p1=0.256, p2=0.232  
--- Iter [423/2000] ---  
Total Loss: 3188.0000  
MSE Component: 3.1645 (Weighted: 3164.4959)  
NLL Component: 23.4162  
Min Variance: 1.26e-05  
p1=0.256, p2=0.232  
--- Iter [424/2000] ---  
Total Loss: 3734.0178  
MSE Component: 3.7184 (Weighted: 3718.4379)  
NLL Component: 15.4920  
Min Variance: 1.01e-05  
p1=0.256, p2=0.232  
--- Iter [425/2000] ---  
Total Loss: 3438.2815  
MSE Component: 3.4152 (Weighted: 3415.2071)  
NLL Component: 22.9865  
Min Variance: 4.21e-06  
p1=0.256, p2=0.232  
--- Iter [426/2000] ---  
Total Loss: 3656.3511  
MSE Component: 3.6257 (Weighted: 3625.6585)  
NLL Component: 30.6048  
Min Variance: 9.22e-06  
p1=0.256, p2=0.232  
--- Iter [427/2000] ---  
Total Loss: 2719.5046  
MSE Component: 2.6951 (Weighted: 2695.1206)  
NLL Component: 24.2961  
Min Variance: 3.91e-06  
p1=0.256, p2=0.232  
--- Iter [428/2000] ---  
Total Loss: 5068.4429  
MSE Component: 5.0508 (Weighted: 5050.7975)  
NLL Component: 17.5576  
Min Variance: 5.86e-06  
p1=0.255, p2=0.232  
--- Iter [429/2000] ---  
Total Loss: 4454.1885  
MSE Component: 4.4315 (Weighted: 4431.5395)  
NLL Component: 22.5610

```

Min Variance: 4.09e-06
p1=0.255, p2=0.232
--- Iter [430/2000] ---
Total Loss: 2809.2817
MSE Component: 2.7881 (Weighted: 2788.0902)
NLL Component: 21.1034
Min Variance: 1.08e-05
p1=0.255, p2=0.232

--- Validation at iteration 430 ---
Average MSE: 349.7628, Average ANEES: 438.9063
-----
--- Iter [431/2000] ---
Total Loss: 4100.7935
MSE Component: 4.0719 (Weighted: 4071.8513)
NLL Component: 28.8544
Min Variance: 5.02e-06
p1=0.255, p2=0.232
--- Iter [432/2000] ---
Total Loss: 2021.9856
MSE Component: 2.0055 (Weighted: 2005.4824)
NLL Component: 16.4152
Min Variance: 8.10e-06
p1=0.255, p2=0.232
--- Iter [433/2000] ---
Total Loss: 3359.5427
MSE Component: 3.3339 (Weighted: 3333.8852)
NLL Component: 25.5697
Min Variance: 8.86e-06
p1=0.255, p2=0.232
--- Iter [434/2000] ---
Total Loss: 2399.2935
MSE Component: 2.3785 (Weighted: 2378.4773)
NLL Component: 20.7283
Min Variance: 1.39e-05
p1=0.255, p2=0.232
--- Iter [435/2000] ---
Total Loss: 3925.8694
MSE Component: 3.8993 (Weighted: 3899.2889)
NLL Component: 26.4927
Min Variance: 1.29e-05
p1=0.255, p2=0.232
--- Iter [436/2000] ---
Total Loss: 3424.4480
MSE Component: 3.4049 (Weighted: 3404.8891)
NLL Component: 19.4710
Min Variance: 5.75e-06
p1=0.255, p2=0.232

```

```
--- Iter [437/2000] ---
Total Loss: 3146.2610
MSE Component: 3.1298 (Weighted: 3129.8442)
NLL Component: 16.3288
Min Variance: 3.98e-06
p1=0.255, p2=0.232
--- Iter [438/2000] ---
Total Loss: 4002.3884
MSE Component: 3.9791 (Weighted: 3979.0778)
NLL Component: 23.2227
Min Variance: 2.94e-06
p1=0.255, p2=0.232
--- Iter [439/2000] ---
Total Loss: 3366.4766
MSE Component: 3.3514 (Weighted: 3351.4042)
NLL Component: 14.9844
Min Variance: 9.42e-06
p1=0.255, p2=0.232
--- Iter [440/2000] ---
Total Loss: 3965.4185
MSE Component: 3.9435 (Weighted: 3943.5437)
NLL Component: 21.7870
Min Variance: 7.92e-06
p1=0.255, p2=0.232

--- Validation at iteration 440 ---
Average MSE: 355.3252, Average ANEES: 408.7149
-----
--- Iter [441/2000] ---
Total Loss: 3476.0969
MSE Component: 3.4531 (Weighted: 3453.0559)
NLL Component: 22.9531
Min Variance: 7.21e-06
p1=0.255, p2=0.232
--- Iter [442/2000] ---
Total Loss: 3774.8784
MSE Component: 3.7481 (Weighted: 3748.1492)
NLL Component: 26.6413
Min Variance: 4.28e-06
p1=0.255, p2=0.232
--- Iter [443/2000] ---
Total Loss: 2622.3174
MSE Component: 2.6029 (Weighted: 2602.8798)
NLL Component: 19.3496
Min Variance: 6.94e-06
p1=0.255, p2=0.232
--- Iter [444/2000] ---
Total Loss: 2510.1504
```

MSE Component: 2.4862 (Weighted: 2486.2006)  
NLL Component: 23.8619  
Min Variance: 5.41e-06  
p1=0.255, p2=0.232  
--- Iter [445/2000] ---  
Total Loss: 3806.6694  
MSE Component: 3.7848 (Weighted: 3784.8423)  
NLL Component: 21.7393  
Min Variance: 4.51e-06  
p1=0.255, p2=0.232  
--- Iter [446/2000] ---  
Total Loss: 3038.7190  
MSE Component: 3.0100 (Weighted: 3009.9740)  
NLL Component: 28.6571  
Min Variance: 4.49e-06  
p1=0.255, p2=0.232  
--- Iter [447/2000] ---  
Total Loss: 2623.1587  
MSE Component: 2.6015 (Weighted: 2601.5100)  
NLL Component: 21.5608  
Min Variance: 4.44e-06  
p1=0.255, p2=0.232  
--- Iter [448/2000] ---  
Total Loss: 2790.0354  
MSE Component: 2.7735 (Weighted: 2773.5088)  
NLL Component: 16.4386  
Min Variance: 1.50e-05  
p1=0.255, p2=0.232  
--- Iter [449/2000] ---  
Total Loss: 4225.7031  
MSE Component: 4.1978 (Weighted: 4197.8106)  
NLL Component: 27.8047  
Min Variance: 7.62e-06  
p1=0.255, p2=0.232  
--- Iter [450/2000] ---  
Total Loss: 3427.6467  
MSE Component: 3.4085 (Weighted: 3408.5412)  
NLL Component: 19.0177  
Min Variance: 1.30e-05  
p1=0.255, p2=0.232  
  
--- Validation at iteration 450 ---  
Average MSE: 321.1517, Average ANEES: 396.6432

---

--- Iter [451/2000] ---  
Total Loss: 3838.9775  
MSE Component: 3.8186 (Weighted: 3818.6309)  
NLL Component: 20.2588

Min Variance: 1.52e-06  
p1=0.255, p2=0.232  
--- Iter [452/2000] ---  
Total Loss: 3787.4329  
MSE Component: 3.7632 (Weighted: 3763.2482)  
NLL Component: 24.0966  
Min Variance: 6.53e-06  
p1=0.255, p2=0.232  
--- Iter [453/2000] ---  
Total Loss: 3252.5530  
MSE Component: 3.2308 (Weighted: 3230.8424)  
NLL Component: 21.6228  
Min Variance: 6.20e-06  
p1=0.255, p2=0.232  
--- Iter [454/2000] ---  
Total Loss: 2856.6873  
MSE Component: 2.8378 (Weighted: 2837.7903)  
NLL Component: 18.8091  
Min Variance: 1.09e-05  
p1=0.255, p2=0.232  
--- Iter [455/2000] ---  
Total Loss: 2998.3950  
MSE Component: 2.9777 (Weighted: 2977.7448)  
NLL Component: 20.5622  
Min Variance: 1.24e-05  
p1=0.255, p2=0.232  
--- Iter [456/2000] ---  
Total Loss: 3048.7917  
MSE Component: 3.0263 (Weighted: 3026.2923)  
NLL Component: 22.4115  
Min Variance: 6.03e-06  
p1=0.255, p2=0.232  
--- Iter [457/2000] ---  
Total Loss: 3006.9941  
MSE Component: 2.9813 (Weighted: 2981.3416)  
NLL Component: 25.5647  
Min Variance: 6.56e-06  
p1=0.255, p2=0.232  
--- Iter [458/2000] ---  
Total Loss: 2752.8037  
MSE Component: 2.7284 (Weighted: 2728.3692)  
NLL Component: 24.3466  
Min Variance: 2.80e-06  
p1=0.255, p2=0.232  
--- Iter [459/2000] ---  
Total Loss: 3335.8328  
MSE Component: 3.3180 (Weighted: 3317.9927)  
NLL Component: 17.7522

```
Min Variance: 3.83e-06
p1=0.255, p2=0.232
--- Iter [460/2000] ---
Total Loss: 4314.1035
MSE Component: 4.2897 (Weighted: 4289.6972)
NLL Component: 24.3183
Min Variance: 3.72e-06
p1=0.255, p2=0.232

--- Validation at iteration 460 ---
Average MSE: 338.8893, Average ANEES: 373.2183
-----
--- Iter [461/2000] ---
Total Loss: 4997.3984
MSE Component: 4.9746 (Weighted: 4974.5646)
NLL Component: 22.7460
Min Variance: 7.46e-06
p1=0.255, p2=0.232
--- Iter [462/2000] ---
Total Loss: 2740.0547
MSE Component: 2.7291 (Weighted: 2729.1210)
NLL Component: 10.8458
Min Variance: 1.48e-05
p1=0.255, p2=0.232
--- Iter [463/2000] ---
Total Loss: 4177.4673
MSE Component: 4.1576 (Weighted: 4157.5985)
NLL Component: 19.7808
Min Variance: 8.59e-06
p1=0.255, p2=0.232
--- Iter [464/2000] ---
Total Loss: 3678.3022
MSE Component: 3.6612 (Weighted: 3661.2360)
NLL Component: 16.9783
Min Variance: 5.87e-06
p1=0.255, p2=0.232
--- Iter [465/2000] ---
Total Loss: 4296.7529
MSE Component: 4.2771 (Weighted: 4277.0829)
NLL Component: 19.5820
Min Variance: 9.04e-06
p1=0.255, p2=0.232
--- Iter [466/2000] ---
Total Loss: 3888.4072
MSE Component: 3.8635 (Weighted: 3863.4818)
NLL Component: 24.8377
Min Variance: 2.33e-06
p1=0.255, p2=0.232
```

```

--- Iter [467/2000] ---
Total Loss: 3583.8271
MSE Component: 3.5548 (Weighted: 3554.8382)
NLL Component: 28.9012
Min Variance: 2.16e-06
p1=0.255, p2=0.232
--- Iter [468/2000] ---
Total Loss: 4075.0288
MSE Component: 4.0549 (Weighted: 4054.9197)
NLL Component: 20.0212
Min Variance: 3.47e-06
p1=0.255, p2=0.232
--- Iter [469/2000] ---
Total Loss: 2992.9104
MSE Component: 2.9675 (Weighted: 2967.4826)
NLL Component: 25.3398
Min Variance: 4.42e-06
p1=0.255, p2=0.232
--- Iter [470/2000] ---
Total Loss: 4052.4817
MSE Component: 4.0295 (Weighted: 4029.4867)
NLL Component: 22.9071
Min Variance: 6.87e-06
p1=0.255, p2=0.232

--- Validation at iteration 470 ---
Average MSE: 370.2803, Average ANEES: 363.1668
-----
--- Iter [471/2000] ---
Total Loss: 4827.4785
MSE Component: 4.8012 (Weighted: 4801.2252)
NLL Component: 26.1655
Min Variance: 3.39e-06
p1=0.255, p2=0.232
--- Iter [472/2000] ---
Total Loss: 5787.1953
MSE Component: 5.7673 (Weighted: 5767.2696)
NLL Component: 19.8377
Min Variance: 9.81e-06
p1=0.255, p2=0.232
--- Iter [473/2000] ---
Total Loss: 4137.3950
MSE Component: 4.1149 (Weighted: 4114.8648)
NLL Component: 22.4424
Min Variance: 5.43e-06
p1=0.255, p2=0.232
--- Iter [474/2000] ---
Total Loss: 3990.5615

```

MSE Component: 3.9735 (Weighted: 3973.5339)  
NLL Component: 16.9398  
Min Variance: 5.89e-06  
p1=0.255, p2=0.232  
--- Iter [475/2000] ---  
Total Loss: 2384.4727  
MSE Component: 2.3667 (Weighted: 2366.7085)  
NLL Component: 17.6762  
Min Variance: 1.55e-05  
p1=0.255, p2=0.232  
--- Iter [476/2000] ---  
Total Loss: 4159.6348  
MSE Component: 4.1333 (Weighted: 4133.2855)  
NLL Component: 26.2612  
Min Variance: 4.17e-06  
p1=0.255, p2=0.232  
--- Iter [477/2000] ---  
Total Loss: 4445.2456  
MSE Component: 4.4260 (Weighted: 4425.9663)  
NLL Component: 19.1915  
Min Variance: 4.48e-06  
p1=0.255, p2=0.232  
--- Iter [478/2000] ---  
Total Loss: 6000.2549  
MSE Component: 5.9870 (Weighted: 5986.9504)  
NLL Component: 13.2166  
Min Variance: 1.49e-05  
p1=0.255, p2=0.232  
--- Iter [479/2000] ---  
Total Loss: 5890.3096  
MSE Component: 5.8677 (Weighted: 5867.7454)  
NLL Component: 22.4759  
Min Variance: 2.52e-06  
p1=0.255, p2=0.232  
--- Iter [480/2000] ---  
Total Loss: 2734.7041  
MSE Component: 2.7119 (Weighted: 2711.9403)  
NLL Component: 22.6761  
Min Variance: 1.14e-05  
p1=0.255, p2=0.232  
  
--- Validation at iteration 480 ---  
Average MSE: 308.0545, Average ANEES: 512.8065

---

--- Iter [481/2000] ---  
Total Loss: 6944.3232  
MSE Component: 6.9253 (Weighted: 6925.3449)  
NLL Component: 18.8904

```

Min Variance: 1.11e-05
p1=0.255, p2=0.232
--- Iter [482/2000] ---
Total Loss: 4804.2866
MSE Component: 4.7842 (Weighted: 4784.1592)
NLL Component: 20.0396
Min Variance: 9.44e-06
p1=0.255, p2=0.232
--- Iter [483/2000] ---
Total Loss: 2470.2141
MSE Component: 2.4463 (Weighted: 2446.3160)
NLL Component: 23.8102
Min Variance: 3.65e-06
p1=0.255, p2=0.232
--- Iter [484/2000] ---
Total Loss: 3426.6289
MSE Component: 3.4033 (Weighted: 3403.2903)
NLL Component: 23.2507
Min Variance: 6.06e-06
p1=0.255, p2=0.232
--- Iter [485/2000] ---
Total Loss: 5783.5957
MSE Component: 5.7646 (Weighted: 5764.5659)
NLL Component: 18.9418
Min Variance: 8.33e-06
p1=0.255, p2=0.232
--- Iter [486/2000] ---
Total Loss: 7837.3120
MSE Component: 7.8075 (Weighted: 7807.4737)
NLL Component: 29.7506
Min Variance: 6.42e-06
p1=0.255, p2=0.232
--- Iter [487/2000] ---
Total Loss: 9119.8262
MSE Component: 9.0908 (Weighted: 9090.8060)
NLL Component: 28.9325
Min Variance: 8.85e-07
p1=0.255, p2=0.232
--- Iter [488/2000] ---
Total Loss: 9938.4336
MSE Component: 9.9111 (Weighted: 9911.1395)
NLL Component: 27.2059
Min Variance: 1.26e-05
p1=0.255, p2=0.232
--- Iter [489/2000] ---
Total Loss: 10303.8408
MSE Component: 10.2772 (Weighted: 10277.2331)
NLL Component: 26.5193

```

```

Min Variance: 7.90e-06
p1=0.255, p2=0.232
--- Iter [490/2000] ---
Total Loss: 7646.8916
MSE Component: 7.6187 (Weighted: 7618.6833)
NLL Component: 28.1204
Min Variance: 1.25e-05
p1=0.255, p2=0.232

--- Validation at iteration 490 ---
Average MSE: 355.8243, Average ANEES: 460.6268
-----
--- Iter [491/2000] ---
Total Loss: 6868.9033
MSE Component: 6.8385 (Weighted: 6838.4981)
NLL Component: 30.3173
Min Variance: 6.39e-06
p1=0.255, p2=0.232
--- Iter [492/2000] ---
Total Loss: 5205.0933
MSE Component: 5.1831 (Weighted: 5183.0506)
NLL Component: 21.9547
Min Variance: 5.38e-06
p1=0.255, p2=0.232
--- Iter [493/2000] ---
Total Loss: 4571.9409
MSE Component: 4.5344 (Weighted: 4534.3924)
NLL Component: 37.4605
Min Variance: 5.30e-06
p1=0.255, p2=0.232
--- Iter [494/2000] ---
Total Loss: 4684.3779
MSE Component: 4.6611 (Weighted: 4661.0579)
NLL Component: 23.2318
Min Variance: 1.27e-05
p1=0.255, p2=0.232
--- Iter [495/2000] ---
Total Loss: 4120.9482
MSE Component: 4.0977 (Weighted: 4097.7168)
NLL Component: 23.1436
Min Variance: 5.16e-06
p1=0.255, p2=0.232
--- Iter [496/2000] ---
Total Loss: 6147.3447
MSE Component: 6.1313 (Weighted: 6131.3400)
NLL Component: 15.9172
Min Variance: 1.01e-05
p1=0.255, p2=0.232

```

```
--- Iter [497/2000] ---
Total Loss: 10838.2354
MSE Component: 10.8179 (Weighted: 10817.9455)
NLL Component: 20.2017
Min Variance: 5.80e-06
p1=0.255, p2=0.232
--- Iter [498/2000] ---
Total Loss: 14481.5400
MSE Component: 14.4627 (Weighted: 14462.6760)
NLL Component: 18.7760
Min Variance: 7.65e-06
p1=0.255, p2=0.232
--- Iter [499/2000] ---
Total Loss: 10097.8867
MSE Component: 10.0729 (Weighted: 10072.8884)
NLL Component: 24.9102
Min Variance: 2.38e-06
p1=0.255, p2=0.232
--- Iter [500/2000] ---
Total Loss: 10155.0430
MSE Component: 10.1352 (Weighted: 10135.1910)
NLL Component: 19.7641
Min Variance: 8.10e-06
p1=0.255, p2=0.232

--- Validation at iteration 500 ---
Average MSE: 296.7533, Average ANEES: 476.2235
-----
--- Iter [501/2000] ---
Total Loss: 6232.6631
MSE Component: 6.2124 (Weighted: 6212.3971)
NLL Component: 20.1784
Min Variance: 8.06e-06
p1=0.255, p2=0.232
--- Iter [502/2000] ---
Total Loss: 3915.8132
MSE Component: 3.8960 (Weighted: 3895.9560)
NLL Component: 19.7693
Min Variance: 4.19e-06
p1=0.255, p2=0.232
--- Iter [503/2000] ---
Total Loss: 3040.2000
MSE Component: 3.0227 (Weighted: 3022.7275)
NLL Component: 17.3845
Min Variance: 5.19e-06
p1=0.255, p2=0.232
--- Iter [504/2000] ---
Total Loss: 3150.4673
```

MSE Component: 3.1332 (Weighted: 3133.1756)  
NLL Component: 17.2039  
Min Variance: 7.54e-06  
p1=0.255, p2=0.232  
--- Iter [505/2000] ---  
Total Loss: 3829.0557  
MSE Component: 3.7993 (Weighted: 3799.2895)  
NLL Component: 29.6782  
Min Variance: 1.13e-05  
p1=0.255, p2=0.232  
--- Iter [506/2000] ---  
Total Loss: 7430.6260  
MSE Component: 7.4027 (Weighted: 7402.6837)  
NLL Component: 27.8544  
Min Variance: 4.03e-06  
p1=0.255, p2=0.232  
--- Iter [507/2000] ---  
Total Loss: 9063.3027  
MSE Component: 9.0345 (Weighted: 9034.4734)  
NLL Component: 28.7414  
Min Variance: 4.92e-06  
p1=0.255, p2=0.232  
--- Iter [508/2000] ---  
Total Loss: 6171.3770  
MSE Component: 6.1474 (Weighted: 6147.4409)  
NLL Component: 23.8481  
Min Variance: 2.55e-06  
p1=0.255, p2=0.232  
--- Iter [509/2000] ---  
Total Loss: 11516.9922  
MSE Component: 11.4959 (Weighted: 11495.9116)  
NLL Component: 20.9932  
Min Variance: 8.76e-06  
p1=0.255, p2=0.232  
--- Iter [510/2000] ---  
Total Loss: 8500.6934  
MSE Component: 8.4753 (Weighted: 8475.2522)  
NLL Component: 25.3535  
Min Variance: 1.13e-05  
p1=0.255, p2=0.232  
  
--- Validation at iteration 510 ---  
Average MSE: 341.5145, Average ANEES: 402.7683

---

--- Iter [511/2000] ---  
Total Loss: 5838.3945  
MSE Component: 5.8080 (Weighted: 5808.0130)  
NLL Component: 30.2936

```
Min Variance: 6.19e-06
p1=0.255, p2=0.232
--- Iter [512/2000] ---
Total Loss: 8334.9912
MSE Component: 8.3100 (Weighted: 8309.9508)
NLL Component: 24.9521
Min Variance: 1.26e-05
p1=0.255, p2=0.232
--- Iter [513/2000] ---
Total Loss: 7798.2769
MSE Component: 7.7785 (Weighted: 7778.5330)
NLL Component: 19.6559
Min Variance: 6.69e-06
p1=0.255, p2=0.232
--- Iter [514/2000] ---
Total Loss: 5993.4985
MSE Component: 5.9677 (Weighted: 5967.7334)
NLL Component: 25.6771
Min Variance: 2.74e-06
p1=0.255, p2=0.232
--- Iter [515/2000] ---
Total Loss: 3075.1204
MSE Component: 3.0495 (Weighted: 3049.5243)
NLL Component: 25.5081
Min Variance: 6.98e-06
p1=0.255, p2=0.232
--- Iter [516/2000] ---
Total Loss: 3179.7527
MSE Component: 3.1605 (Weighted: 3160.4981)
NLL Component: 19.1669
Min Variance: 9.68e-06
p1=0.255, p2=0.232
--- Iter [517/2000] ---
Total Loss: 5078.6367
MSE Component: 5.0553 (Weighted: 5055.3427)
NLL Component: 23.2058
Min Variance: 6.15e-06
p1=0.255, p2=0.232
--- Iter [518/2000] ---
Total Loss: 4763.5493
MSE Component: 4.7412 (Weighted: 4741.2190)
NLL Component: 22.2423
Min Variance: 9.98e-06
p1=0.255, p2=0.232
--- Iter [519/2000] ---
Total Loss: 5055.3618
MSE Component: 5.0366 (Weighted: 5036.6454)
NLL Component: 18.6286
```

```
Min Variance: 4.53e-06
p1=0.255, p2=0.232
--- Iter [520/2000] ---
Total Loss: 8431.0859
MSE Component: 8.4151 (Weighted: 8415.1478)
NLL Component: 15.8507
Min Variance: 1.31e-05
p1=0.255, p2=0.232

--- Validation at iteration 520 ---
Average MSE: 373.8008, Average ANEES: 403.5556
-----
--- Iter [521/2000] ---
Total Loss: 7077.5254
MSE Component: 7.0618 (Weighted: 7061.7638)
NLL Component: 15.6736
Min Variance: 1.28e-05
p1=0.255, p2=0.232
--- Iter [522/2000] ---
Total Loss: 2155.5271
MSE Component: 2.1415 (Weighted: 2141.5069)
NLL Component: 13.9324
Min Variance: 1.56e-05
p1=0.255, p2=0.232
--- Iter [523/2000] ---
Total Loss: 5905.2910
MSE Component: 5.8875 (Weighted: 5887.4531)
NLL Component: 17.7498
Min Variance: 5.53e-06
p1=0.255, p2=0.232
--- Iter [524/2000] ---
Total Loss: 3617.6372
MSE Component: 3.5931 (Weighted: 3593.0929)
NLL Component: 24.4563
Min Variance: 1.22e-05
p1=0.255, p2=0.232
--- Iter [525/2000] ---
Total Loss: 4187.4922
MSE Component: 4.1687 (Weighted: 4168.7455)
NLL Component: 18.6586
Min Variance: 5.67e-06
p1=0.255, p2=0.232
--- Iter [526/2000] ---
Total Loss: 3399.0652
MSE Component: 3.3734 (Weighted: 3373.4112)
NLL Component: 25.5662
Min Variance: 6.24e-06
p1=0.255, p2=0.232
```

```
--- Iter [527/2000] ---
Total Loss: 3365.2351
MSE Component: 3.3402 (Weighted: 3340.1830)
NLL Component: 24.9640
Min Variance: 3.47e-06
p1=0.255, p2=0.232
--- Iter [528/2000] ---
Total Loss: 5484.4014
MSE Component: 5.4554 (Weighted: 5455.4262)
NLL Component: 28.8872
Min Variance: 9.26e-06
p1=0.255, p2=0.232
--- Iter [529/2000] ---
Total Loss: 4717.6294
MSE Component: 4.6914 (Weighted: 4691.3681)
NLL Component: 26.1733
Min Variance: 4.44e-06
p1=0.255, p2=0.232
--- Iter [530/2000] ---
Total Loss: 3930.9075
MSE Component: 3.9033 (Weighted: 3903.3468)
NLL Component: 27.4729
Min Variance: 4.76e-06
p1=0.255, p2=0.232

--- Validation at iteration 530 ---
Average MSE: 307.5410, Average ANEES: 557.2455
-----
--- Iter [531/2000] ---
Total Loss: 7225.1304
MSE Component: 7.1917 (Weighted: 7191.6590)
NLL Component: 33.3834
Min Variance: 4.17e-06
p1=0.255, p2=0.232
--- Iter [532/2000] ---
Total Loss: 5194.6895
MSE Component: 5.1718 (Weighted: 5171.7629)
NLL Component: 22.8383
Min Variance: 9.98e-06
p1=0.255, p2=0.232
--- Iter [533/2000] ---
Total Loss: 4226.4619
MSE Component: 4.2031 (Weighted: 4203.0730)
NLL Component: 23.3006
Min Variance: 1.12e-05
p1=0.255, p2=0.232
--- Iter [534/2000] ---
Total Loss: 4678.6699
```

MSE Component: 4.6550 (Weighted: 4655.0131)  
NLL Component: 23.5689  
Min Variance: 7.74e-06  
p1=0.255, p2=0.232  
--- Iter [535/2000] ---  
Total Loss: 2914.0354  
MSE Component: 2.8900 (Weighted: 2890.0375)  
NLL Component: 23.9099  
Min Variance: 6.95e-06  
p1=0.255, p2=0.232  
--- Iter [536/2000] ---  
Total Loss: 5371.6626  
MSE Component: 5.3507 (Weighted: 5350.7485)  
NLL Component: 20.8261  
Min Variance: 9.40e-06  
p1=0.255, p2=0.232  
--- Iter [537/2000] ---  
Total Loss: 3078.3608  
MSE Component: 3.0536 (Weighted: 3053.5514)  
NLL Component: 24.7214  
Min Variance: 2.37e-06  
p1=0.255, p2=0.232  
--- Iter [538/2000] ---  
Total Loss: 4612.8789  
MSE Component: 4.5983 (Weighted: 4598.3276)  
NLL Component: 14.4633  
Min Variance: 1.23e-05  
p1=0.255, p2=0.232  
--- Iter [539/2000] ---  
Total Loss: 7158.6982  
MSE Component: 7.1412 (Weighted: 7141.2139)  
NLL Component: 17.3965  
Min Variance: 1.38e-05  
p1=0.255, p2=0.232  
--- Iter [540/2000] ---  
Total Loss: 3353.7161  
MSE Component: 3.3379 (Weighted: 3337.8701)  
NLL Component: 15.7579  
Min Variance: 8.24e-06  
p1=0.255, p2=0.232  
  
--- Validation at iteration 540 ---  
Average MSE: 319.6253, Average ANEES: 476.2382

---

--- Iter [541/2000] ---  
Total Loss: 3462.3076  
MSE Component: 3.4364 (Weighted: 3436.4467)  
NLL Component: 25.7730

```

Min Variance: 7.64e-06
p1=0.255, p2=0.232
--- Iter [542/2000] ---
Total Loss: 3540.8613
MSE Component: 3.5220 (Weighted: 3521.9553)
NLL Component: 18.8181
Min Variance: 1.04e-05
p1=0.255, p2=0.232
--- Iter [543/2000] ---
Total Loss: 3567.9224
MSE Component: 3.5426 (Weighted: 3542.5751)
NLL Component: 25.2592
Min Variance: 1.45e-05
p1=0.255, p2=0.232
--- Iter [544/2000] ---
Total Loss: 3580.3398
MSE Component: 3.5562 (Weighted: 3556.2158)
NLL Component: 24.0362
Min Variance: 5.73e-06
p1=0.255, p2=0.232
--- Iter [545/2000] ---
Total Loss: 4906.2520
MSE Component: 4.8829 (Weighted: 4882.8998)
NLL Component: 23.2641
Min Variance: 6.89e-06
p1=0.255, p2=0.232
--- Iter [546/2000] ---
Total Loss: 2393.0898
MSE Component: 2.3675 (Weighted: 2367.4541)
NLL Component: 25.5479
Min Variance: 6.16e-06
p1=0.255, p2=0.232
--- Iter [547/2000] ---
Total Loss: 4048.6311
MSE Component: 4.0203 (Weighted: 4020.2928)
NLL Component: 28.2506
Min Variance: 1.07e-05
p1=0.254, p2=0.232
--- Iter [548/2000] ---
Total Loss: 3264.9858
MSE Component: 3.2365 (Weighted: 3236.4700)
NLL Component: 28.4279
Min Variance: 3.71e-06
p1=0.254, p2=0.232
--- Iter [549/2000] ---
Total Loss: 3163.9700
MSE Component: 3.1418 (Weighted: 3141.7973)
NLL Component: 22.0848

```

```
Min Variance: 1.08e-05
p1=0.254, p2=0.232
--- Iter [550/2000] ---
Total Loss: 3524.9922
MSE Component: 3.5049 (Weighted: 3504.9362)
NLL Component: 19.9680
Min Variance: 3.53e-06
p1=0.254, p2=0.232

--- Validation at iteration 550 ---
Average MSE: 324.0895, Average ANEES: 384.0953
-----
--- Iter [551/2000] ---
Total Loss: 2975.3967
MSE Component: 2.9536 (Weighted: 2953.5780)
NLL Component: 21.7310
Min Variance: 1.23e-05
p1=0.254, p2=0.232
--- Iter [552/2000] ---
Total Loss: 2765.9285
MSE Component: 2.7471 (Weighted: 2747.1032)
NLL Component: 18.7372
Min Variance: 1.32e-05
p1=0.254, p2=0.232
--- Iter [553/2000] ---
Total Loss: 6478.3535
MSE Component: 6.4535 (Weighted: 6453.5389)
NLL Component: 24.7267
Min Variance: 6.77e-06
p1=0.254, p2=0.232
--- Iter [554/2000] ---
Total Loss: 4404.0610
MSE Component: 4.3853 (Weighted: 4385.2539)
NLL Component: 18.7191
Min Variance: 9.35e-06
p1=0.254, p2=0.232
--- Iter [555/2000] ---
Total Loss: 3839.6438
MSE Component: 3.8225 (Weighted: 3822.4523)
NLL Component: 17.1035
Min Variance: 9.31e-06
p1=0.254, p2=0.232
--- Iter [556/2000] ---
Total Loss: 3887.1445
MSE Component: 3.8734 (Weighted: 3873.3506)
NLL Component: 13.7061
Min Variance: 3.46e-06
p1=0.254, p2=0.232
```

```
--- Iter [557/2000] ---
Total Loss: 3698.2434
MSE Component: 3.6819 (Weighted: 3681.9379)
NLL Component: 16.2174
Min Variance: 1.57e-05
p1=0.254, p2=0.232
--- Iter [558/2000] ---
Total Loss: 3052.7427
MSE Component: 3.0309 (Weighted: 3030.9341)
NLL Component: 21.7208
Min Variance: 2.10e-05
p1=0.254, p2=0.232
--- Iter [559/2000] ---
Total Loss: 2863.7529
MSE Component: 2.8453 (Weighted: 2845.3002)
NLL Component: 18.3648
Min Variance: 1.05e-05
p1=0.254, p2=0.232
--- Iter [560/2000] ---
Total Loss: 3639.1855
MSE Component: 3.6133 (Weighted: 3613.3373)
NLL Component: 25.7606
Min Variance: 8.82e-06
p1=0.254, p2=0.232

--- Validation at iteration 560 ---
Average MSE: 287.7068, Average ANEES: 563.4045
-----
--- Iter [561/2000] ---
Total Loss: 3113.4336
MSE Component: 3.0869 (Weighted: 3086.9215)
NLL Component: 26.4243
Min Variance: 8.25e-06
p1=0.254, p2=0.232
--- Iter [562/2000] ---
Total Loss: 5063.3643
MSE Component: 5.0396 (Weighted: 5039.5627)
NLL Component: 23.7141
Min Variance: 6.49e-06
p1=0.254, p2=0.232
--- Iter [563/2000] ---
Total Loss: 4431.7466
MSE Component: 4.4011 (Weighted: 4401.0720)
NLL Component: 30.5866
Min Variance: 9.10e-06
p1=0.254, p2=0.232
--- Iter [564/2000] ---
Total Loss: 3583.6641
```

MSE Component: 3.5609 (Weighted: 3560.9031)  
NLL Component: 22.6731  
Min Variance: 1.33e-05  
p1=0.254, p2=0.232  
--- Iter [565/2000] ---  
Total Loss: 3973.2590  
MSE Component: 3.9476 (Weighted: 3947.6097)  
NLL Component: 25.5615  
Min Variance: 1.15e-06  
p1=0.254, p2=0.232  
--- Iter [566/2000] ---  
Total Loss: 3989.4294  
MSE Component: 3.9718 (Weighted: 3971.7937)  
NLL Component: 17.5479  
Min Variance: 6.40e-06  
p1=0.254, p2=0.232  
--- Iter [567/2000] ---  
Total Loss: 2567.8972  
MSE Component: 2.5412 (Weighted: 2541.2369)  
NLL Component: 26.5724  
Min Variance: 3.27e-06  
p1=0.254, p2=0.232  
--- Iter [568/2000] ---  
Total Loss: 3802.9248  
MSE Component: 3.7857 (Weighted: 3785.7347)  
NLL Component: 17.1022  
Min Variance: 9.39e-06  
p1=0.254, p2=0.232  
--- Iter [569/2000] ---  
Total Loss: 4860.8525  
MSE Component: 4.8425 (Weighted: 4842.5179)  
NLL Component: 18.2464  
Min Variance: 2.03e-05  
p1=0.254, p2=0.232  
--- Iter [570/2000] ---  
Total Loss: 3271.1675  
MSE Component: 3.2410 (Weighted: 3240.9618)  
NLL Component: 30.1180  
Min Variance: 4.71e-06  
p1=0.254, p2=0.232  
  
--- Validation at iteration 570 ---  
Average MSE: 302.7095, Average ANEES: 422.7819

---

--- Iter [571/2000] ---  
Total Loss: 3475.2092  
MSE Component: 3.4577 (Weighted: 3457.7293)  
NLL Component: 17.3922

Min Variance: 5.36e-06  
p1=0.254, p2=0.232  
--- Iter [572/2000] ---  
Total Loss: 4150.8892  
MSE Component: 4.1261 (Weighted: 4126.1177)  
NLL Component: 24.6836  
Min Variance: 1.05e-05  
p1=0.254, p2=0.232  
--- Iter [573/2000] ---  
Total Loss: 4294.1587  
MSE Component: 4.2768 (Weighted: 4276.7982)  
NLL Component: 17.2726  
Min Variance: 8.20e-06  
p1=0.254, p2=0.232  
--- Iter [574/2000] ---  
Total Loss: 3679.5940  
MSE Component: 3.6526 (Weighted: 3652.6308)  
NLL Component: 26.8753  
Min Variance: 9.50e-07  
p1=0.254, p2=0.232  
--- Iter [575/2000] ---  
Total Loss: 4265.9712  
MSE Component: 4.2534 (Weighted: 4253.3841)  
NLL Component: 12.4991  
Min Variance: 1.24e-05  
p1=0.254, p2=0.232  
--- Iter [576/2000] ---  
Total Loss: 3576.9919  
MSE Component: 3.5580 (Weighted: 3557.9748)  
NLL Component: 18.9291  
Min Variance: 1.38e-05  
p1=0.254, p2=0.232  
--- Iter [577/2000] ---  
Total Loss: 4384.9385  
MSE Component: 4.3678 (Weighted: 4367.7897)  
NLL Component: 17.0612  
Min Variance: 1.01e-05  
p1=0.254, p2=0.232  
--- Iter [578/2000] ---  
Total Loss: 3563.0144  
MSE Component: 3.5421 (Weighted: 3542.0780)  
NLL Component: 20.8484  
Min Variance: 8.33e-06  
p1=0.254, p2=0.232  
--- Iter [579/2000] ---  
Total Loss: 3793.9656  
MSE Component: 3.7638 (Weighted: 3763.7527)  
NLL Component: 30.1251

```

Min Variance: 8.66e-06
p1=0.254, p2=0.232
--- Iter [580/2000] ---
Total Loss: 4486.4990
MSE Component: 4.4614 (Weighted: 4461.3638)
NLL Component: 25.0473
Min Variance: 3.02e-06
p1=0.254, p2=0.232

--- Validation at iteration 580 ---
Average MSE: 318.3834, Average ANEES: 476.2231
-----
--- Iter [581/2000] ---
Total Loss: 3449.8401
MSE Component: 3.4258 (Weighted: 3425.8249)
NLL Component: 23.9272
Min Variance: 1.95e-05
p1=0.254, p2=0.232
--- Iter [582/2000] ---
Total Loss: 2444.2231
MSE Component: 2.4267 (Weighted: 2426.6529)
NLL Component: 17.4825
Min Variance: 2.45e-06
p1=0.254, p2=0.232
--- Iter [583/2000] ---
Total Loss: 3396.8018
MSE Component: 3.3732 (Weighted: 3373.1639)
NLL Component: 23.5501
Min Variance: 8.97e-06
p1=0.254, p2=0.232
--- Iter [584/2000] ---
Total Loss: 2759.0037
MSE Component: 2.7392 (Weighted: 2739.2273)
NLL Component: 19.6885
Min Variance: 6.92e-06
p1=0.254, p2=0.232
--- Iter [585/2000] ---
Total Loss: 4023.9365
MSE Component: 4.0038 (Weighted: 4003.8123)
NLL Component: 20.0363
Min Variance: 9.74e-06
p1=0.254, p2=0.232
--- Iter [586/2000] ---
Total Loss: 3039.5107
MSE Component: 3.0224 (Weighted: 3022.3584)
NLL Component: 17.0646
Min Variance: 6.29e-06
p1=0.254, p2=0.232

```

```
--- Iter [587/2000] ---
Total Loss: 3720.2795
MSE Component: 3.7007 (Weighted: 3700.7465)
NLL Component: 19.4452
Min Variance: 4.38e-06
p1=0.254, p2=0.232
--- Iter [588/2000] ---
Total Loss: 3379.4453
MSE Component: 3.3636 (Weighted: 3363.6436)
NLL Component: 15.7140
Min Variance: 5.77e-06
p1=0.254, p2=0.232
--- Iter [589/2000] ---
Total Loss: 3708.2559
MSE Component: 3.6853 (Weighted: 3685.2858)
NLL Component: 22.8820
Min Variance: 8.39e-06
p1=0.254, p2=0.232
--- Iter [590/2000] ---
Total Loss: 3281.2571
MSE Component: 3.2568 (Weighted: 3256.8202)
NLL Component: 24.3488
Min Variance: 4.77e-06
p1=0.254, p2=0.232

--- Validation at iteration 590 ---
Average MSE: 280.4211, Average ANEES: 467.8824
-----
--- Iter [591/2000] ---
Total Loss: 2588.0779
MSE Component: 2.5706 (Weighted: 2570.5652)
NLL Component: 17.4248
Min Variance: 2.97e-06
p1=0.254, p2=0.232
--- Iter [592/2000] ---
Total Loss: 2873.2288
MSE Component: 2.8514 (Weighted: 2851.4225)
NLL Component: 21.7182
Min Variance: 1.24e-05
p1=0.254, p2=0.232
--- Iter [593/2000] ---
Total Loss: 4497.1743
MSE Component: 4.4795 (Weighted: 4479.5351)
NLL Component: 17.5514
Min Variance: 1.51e-05
p1=0.254, p2=0.232
--- Iter [594/2000] ---
Total Loss: 2973.5981
```

MSE Component: 2.9498 (Weighted: 2949.8489)  
NLL Component: 23.6613  
Min Variance: 5.70e-06  
p1=0.254, p2=0.231  
--- Iter [595/2000] ---  
Total Loss: 3208.2146  
MSE Component: 3.1847 (Weighted: 3184.7103)  
NLL Component: 23.4164  
Min Variance: 4.38e-06  
p1=0.254, p2=0.231  
--- Iter [596/2000] ---  
Total Loss: 3100.7805  
MSE Component: 3.0807 (Weighted: 3080.6522)  
NLL Component: 20.0404  
Min Variance: 9.90e-06  
p1=0.254, p2=0.231  
--- Iter [597/2000] ---  
Total Loss: 3140.6208  
MSE Component: 3.1228 (Weighted: 3122.7782)  
NLL Component: 17.7549  
Min Variance: 4.36e-06  
p1=0.254, p2=0.231  
--- Iter [598/2000] ---  
Total Loss: 4010.4009  
MSE Component: 3.9791 (Weighted: 3979.0823)  
NLL Component: 31.2306  
Min Variance: 8.60e-06  
p1=0.254, p2=0.231  
--- Iter [599/2000] ---  
Total Loss: 3047.4238  
MSE Component: 3.0230 (Weighted: 3022.9554)  
NLL Component: 24.3805  
Min Variance: 1.24e-05  
p1=0.254, p2=0.231  
--- Iter [600/2000] ---  
Total Loss: 2801.9253  
MSE Component: 2.7725 (Weighted: 2772.4638)  
NLL Component: 29.3735  
Min Variance: 1.09e-05  
p1=0.254, p2=0.231  
  
--- Validation at iteration 600 ---  
Average MSE: 323.6193, Average ANEES: 491.3443

---

--- Iter [601/2000] ---  
Total Loss: 2657.5144  
MSE Component: 2.6358 (Weighted: 2635.8156)  
NLL Component: 21.6108

Min Variance: 1.71e-05  
p1=0.254, p2=0.231  
--- Iter [602/2000] ---  
Total Loss: 4081.8264  
MSE Component: 4.0562 (Weighted: 4056.1938)  
NLL Component: 25.5448  
Min Variance: 4.91e-06  
p1=0.254, p2=0.231  
--- Iter [603/2000] ---  
Total Loss: 3030.6775  
MSE Component: 3.0130 (Weighted: 3013.0336)  
NLL Component: 17.5558  
Min Variance: 9.35e-06  
p1=0.254, p2=0.231  
--- Iter [604/2000] ---  
Total Loss: 3339.5991  
MSE Component: 3.3137 (Weighted: 3313.7045)  
NLL Component: 25.8068  
Min Variance: 6.12e-06  
p1=0.254, p2=0.231  
--- Iter [605/2000] ---  
Total Loss: 3463.6313  
MSE Component: 3.4414 (Weighted: 3441.3800)  
NLL Component: 22.1632  
Min Variance: 7.07e-06  
p1=0.254, p2=0.231  
--- Iter [606/2000] ---  
Total Loss: 1880.5853  
MSE Component: 1.8623 (Weighted: 1862.2879)  
NLL Component: 18.2097  
Min Variance: 3.74e-06  
p1=0.254, p2=0.231  
--- Iter [607/2000] ---  
Total Loss: 3597.8997  
MSE Component: 3.5709 (Weighted: 3570.9445)  
NLL Component: 26.8671  
Min Variance: 1.24e-05  
p1=0.254, p2=0.231  
--- Iter [608/2000] ---  
Total Loss: 2790.8677  
MSE Component: 2.7718 (Weighted: 2771.8499)  
NLL Component: 18.9298  
Min Variance: 1.32e-05  
p1=0.254, p2=0.231  
--- Iter [609/2000] ---  
Total Loss: 3141.5037  
MSE Component: 3.1164 (Weighted: 3116.4398)  
NLL Component: 24.9759

```
Min Variance: 5.85e-06
p1=0.254, p2=0.231
--- Iter [610/2000] ---
Total Loss: 3401.4846
MSE Component: 3.3818 (Weighted: 3381.8290)
NLL Component: 19.5677
Min Variance: 5.05e-06
p1=0.254, p2=0.231

--- Validation at iteration 610 ---
Average MSE: 322.1079, Average ANEES: 425.8963
-----
--- Iter [611/2000] ---
Total Loss: 3702.0947
MSE Component: 3.6838 (Weighted: 3683.7597)
NLL Component: 18.2472
Min Variance: 5.33e-06
p1=0.254, p2=0.231
--- Iter [612/2000] ---
Total Loss: 3359.2671
MSE Component: 3.3317 (Weighted: 3331.7049)
NLL Component: 27.4743
Min Variance: 7.06e-06
p1=0.254, p2=0.231
--- Iter [613/2000] ---
Total Loss: 4273.0796
MSE Component: 4.2541 (Weighted: 4254.1099)
NLL Component: 18.8819
Min Variance: 8.57e-06
p1=0.254, p2=0.231
--- Iter [614/2000] ---
Total Loss: 3079.2476
MSE Component: 3.0519 (Weighted: 3051.8529)
NLL Component: 27.3066
Min Variance: 9.34e-06
p1=0.254, p2=0.231
--- Iter [615/2000] ---
Total Loss: 2748.4458
MSE Component: 2.7237 (Weighted: 2723.7074)
NLL Component: 24.6505
Min Variance: 1.23e-05
p1=0.254, p2=0.231
--- Iter [616/2000] ---
Total Loss: 2581.6384
MSE Component: 2.5617 (Weighted: 2561.6567)
NLL Component: 19.8938
Min Variance: 5.20e-06
p1=0.254, p2=0.231
```

```
--- Iter [617/2000] ---
Total Loss: 3481.0103
MSE Component: 3.4644 (Weighted: 3464.4151)
NLL Component: 16.5073
Min Variance: 7.65e-06
p1=0.254, p2=0.231
--- Iter [618/2000] ---
Total Loss: 3772.9014
MSE Component: 3.7492 (Weighted: 3749.2354)
NLL Component: 23.5780
Min Variance: 9.23e-06
p1=0.254, p2=0.231
--- Iter [619/2000] ---
Total Loss: 2635.3760
MSE Component: 2.6165 (Weighted: 2616.4980)
NLL Component: 18.7899
Min Variance: 3.21e-06
p1=0.254, p2=0.231
--- Iter [620/2000] ---
Total Loss: 3057.5261
MSE Component: 3.0453 (Weighted: 3045.2669)
NLL Component: 12.1715
Min Variance: 8.08e-06
p1=0.254, p2=0.231

--- Validation at iteration 620 ---
Average MSE: 302.6372, Average ANEES: 454.1036
-----
--- Iter [621/2000] ---
Total Loss: 2920.1965
MSE Component: 2.9035 (Weighted: 2903.4934)
NLL Component: 16.6153
Min Variance: 4.16e-06
p1=0.254, p2=0.231
--- Iter [622/2000] ---
Total Loss: 3913.2061
MSE Component: 3.8873 (Weighted: 3887.3212)
NLL Component: 25.7970
Min Variance: 1.09e-05
p1=0.254, p2=0.231
--- Iter [623/2000] ---
Total Loss: 3311.5786
MSE Component: 3.2898 (Weighted: 3289.8116)
NLL Component: 21.6792
Min Variance: 2.79e-06
p1=0.254, p2=0.231
--- Iter [624/2000] ---
Total Loss: 3596.4319
```

MSE Component: 3.5758 (Weighted: 3575.8324)  
NLL Component: 20.5117  
Min Variance: 1.56e-05  
p1=0.254, p2=0.231  
--- Iter [625/2000] ---  
Total Loss: 2757.5437  
MSE Component: 2.7317 (Weighted: 2731.6725)  
NLL Component: 25.7832  
Min Variance: 6.45e-06  
p1=0.254, p2=0.231  
--- Iter [626/2000] ---  
Total Loss: 2610.6697  
MSE Component: 2.5905 (Weighted: 2590.4639)  
NLL Component: 20.1178  
Min Variance: 1.18e-05  
p1=0.254, p2=0.231  
--- Iter [627/2000] ---  
Total Loss: 2847.0229  
MSE Component: 2.8249 (Weighted: 2824.8508)  
NLL Component: 22.0843  
Min Variance: 8.34e-06  
p1=0.254, p2=0.231  
--- Iter [628/2000] ---  
Total Loss: 3059.4189  
MSE Component: 3.0405 (Weighted: 3040.5478)  
NLL Component: 18.7833  
Min Variance: 3.44e-06  
p1=0.254, p2=0.231  
--- Iter [629/2000] ---  
Total Loss: 2893.6272  
MSE Component: 2.8663 (Weighted: 2866.2722)  
NLL Component: 27.2671  
Min Variance: 1.21e-05  
p1=0.254, p2=0.231  
--- Iter [630/2000] ---  
Total Loss: 2644.7559  
MSE Component: 2.6316 (Weighted: 2631.5672)  
NLL Component: 13.1009  
Min Variance: 8.58e-06  
p1=0.254, p2=0.231  
  
--- Validation at iteration 630 ---  
Average MSE: 339.3404, Average ANEES: 439.9920

---

--- Iter [631/2000] ---  
Total Loss: 2906.4854  
MSE Component: 2.8846 (Weighted: 2884.6457)  
NLL Component: 21.7518

Min Variance: 8.95e-06  
p1=0.254, p2=0.231  
--- Iter [632/2000] ---  
Total Loss: 4026.5081  
MSE Component: 4.0061 (Weighted: 4006.0868)  
NLL Component: 20.3333  
Min Variance: 9.10e-06  
p1=0.254, p2=0.231  
--- Iter [633/2000] ---  
Total Loss: 4060.2646  
MSE Component: 4.0393 (Weighted: 4039.2609)  
NLL Component: 20.9160  
Min Variance: 5.88e-06  
p1=0.254, p2=0.231  
--- Iter [634/2000] ---  
Total Loss: 2412.1318  
MSE Component: 2.3924 (Weighted: 2392.4398)  
NLL Component: 19.6040  
Min Variance: 8.68e-06  
p1=0.254, p2=0.231  
--- Iter [635/2000] ---  
Total Loss: 2803.8799  
MSE Component: 2.7896 (Weighted: 2789.6435)  
NLL Component: 14.1484  
Min Variance: 5.03e-06  
p1=0.254, p2=0.231  
--- Iter [636/2000] ---  
Total Loss: 3044.6052  
MSE Component: 3.0263 (Weighted: 3026.2814)  
NLL Component: 18.2361  
Min Variance: 3.51e-06  
p1=0.254, p2=0.231  
--- Iter [637/2000] ---  
Total Loss: 3350.2988  
MSE Component: 3.3299 (Weighted: 3329.9367)  
NLL Component: 20.2743  
Min Variance: 5.18e-06  
p1=0.254, p2=0.231  
--- Iter [638/2000] ---  
Total Loss: 3045.5291  
MSE Component: 3.0237 (Weighted: 3023.7145)  
NLL Component: 21.7264  
Min Variance: 1.34e-05  
p1=0.254, p2=0.231  
--- Iter [639/2000] ---  
Total Loss: 2507.7188  
MSE Component: 2.4884 (Weighted: 2488.3518)  
NLL Component: 19.2791

```
Min Variance: 1.21e-05
p1=0.254, p2=0.231
--- Iter [640/2000] ---
Total Loss: 2457.1765
MSE Component: 2.4411 (Weighted: 2441.0598)
NLL Component: 16.0288
Min Variance: 7.32e-06
p1=0.254, p2=0.231

--- Validation at iteration 640 ---
Average MSE: 331.9782, Average ANEES: 356.9369
-----
--- Iter [641/2000] ---
Total Loss: 2946.2942
MSE Component: 2.9263 (Weighted: 2926.2674)
NLL Component: 19.9390
Min Variance: 8.33e-06
p1=0.254, p2=0.231
--- Iter [642/2000] ---
Total Loss: 2858.4080
MSE Component: 2.8372 (Weighted: 2837.1708)
NLL Component: 21.1492
Min Variance: 6.49e-06
p1=0.254, p2=0.231
--- Iter [643/2000] ---
Total Loss: 2812.1680
MSE Component: 2.7970 (Weighted: 2797.0290)
NLL Component: 15.0509
Min Variance: 1.44e-05
p1=0.254, p2=0.231
--- Iter [644/2000] ---
Total Loss: 3082.5310
MSE Component: 3.0599 (Weighted: 3059.8643)
NLL Component: 22.5788
Min Variance: 5.89e-06
p1=0.254, p2=0.231
--- Iter [645/2000] ---
Total Loss: 2308.1750
MSE Component: 2.2843 (Weighted: 2284.2696)
NLL Component: 23.8175
Min Variance: 1.52e-05
p1=0.254, p2=0.231
--- Iter [646/2000] ---
Total Loss: 2284.6440
MSE Component: 2.2668 (Weighted: 2266.7778)
NLL Component: 17.7784
Min Variance: 4.99e-06
p1=0.254, p2=0.231
```

```
--- Iter [647/2000] ---
Total Loss: 2784.2300
MSE Component: 2.7580 (Weighted: 2758.0383)
NLL Component: 26.1038
Min Variance: 2.94e-06
p1=0.254, p2=0.231
--- Iter [648/2000] ---
Total Loss: 2140.5012
MSE Component: 2.1209 (Weighted: 2120.9111)
NLL Component: 19.5022
Min Variance: 3.49e-06
p1=0.254, p2=0.231
--- Iter [649/2000] ---
Total Loss: 2907.1169
MSE Component: 2.8867 (Weighted: 2886.6806)
NLL Component: 20.3483
Min Variance: 7.49e-06
p1=0.254, p2=0.231
--- Iter [650/2000] ---
Total Loss: 2715.7998
MSE Component: 2.6938 (Weighted: 2693.8274)
NLL Component: 21.8846
Min Variance: 3.76e-06
p1=0.254, p2=0.231

--- Validation at iteration 650 ---
Average MSE: 280.0148, Average ANEES: 497.0662
-----
--- Iter [651/2000] ---
Total Loss: 2295.9277
MSE Component: 2.2720 (Weighted: 2272.0094)
NLL Component: 23.8307
Min Variance: 4.53e-06
p1=0.254, p2=0.231
--- Iter [652/2000] ---
Total Loss: 2732.0605
MSE Component: 2.7112 (Weighted: 2711.1604)
NLL Component: 20.8123
Min Variance: 2.79e-06
p1=0.254, p2=0.231
--- Iter [653/2000] ---
Total Loss: 3076.1274
MSE Component: 3.0556 (Weighted: 3055.5613)
NLL Component: 20.4782
Min Variance: 9.16e-06
p1=0.254, p2=0.231
--- Iter [654/2000] ---
Total Loss: 3363.7866
```

MSE Component: 3.3354 (Weighted: 3335.4177)  
NLL Component: 28.2810  
Min Variance: 6.34e-06  
p1=0.254, p2=0.231  
--- Iter [655/2000] ---  
Total Loss: 2882.9631  
MSE Component: 2.8627 (Weighted: 2862.6921)  
NLL Component: 20.1832  
Min Variance: 6.94e-06  
p1=0.254, p2=0.231  
--- Iter [656/2000] ---  
Total Loss: 3184.1514  
MSE Component: 3.1644 (Weighted: 3164.3565)  
NLL Component: 19.7070  
Min Variance: 4.96e-06  
p1=0.254, p2=0.231  
--- Iter [657/2000] ---  
Total Loss: 2702.0510  
MSE Component: 2.6791 (Weighted: 2679.0705)  
NLL Component: 22.8925  
Min Variance: 4.27e-06  
p1=0.254, p2=0.231  
--- Iter [658/2000] ---  
Total Loss: 2362.5583  
MSE Component: 2.3450 (Weighted: 2344.9767)  
NLL Component: 17.4938  
Min Variance: 9.53e-06  
p1=0.254, p2=0.231  
--- Iter [659/2000] ---  
Total Loss: 2502.3240  
MSE Component: 2.4886 (Weighted: 2488.6453)  
NLL Component: 13.5909  
Min Variance: 9.58e-06  
p1=0.254, p2=0.231  
--- Iter [660/2000] ---  
Total Loss: 2903.8640  
MSE Component: 2.8750 (Weighted: 2875.0386)  
NLL Component: 28.7376  
Min Variance: 1.40e-05  
p1=0.254, p2=0.231  
  
--- Validation at iteration 660 ---  
Average MSE: 303.7154, Average ANEES: 438.8087

---

--- Iter [661/2000] ---  
Total Loss: 2987.2146  
MSE Component: 2.9639 (Weighted: 2963.8584)  
NLL Component: 23.2684

Min Variance: 7.89e-06  
p1=0.254, p2=0.231  
--- Iter [662/2000] ---  
Total Loss: 2312.8354  
MSE Component: 2.2995 (Weighted: 2299.5129)  
NLL Component: 13.2345  
Min Variance: 1.01e-05  
p1=0.254, p2=0.231  
--- Iter [663/2000] ---  
Total Loss: 2550.0896  
MSE Component: 2.5320 (Weighted: 2532.0334)  
NLL Component: 17.9683  
Min Variance: 5.70e-06  
p1=0.254, p2=0.231  
--- Iter [664/2000] ---  
Total Loss: 2301.2437  
MSE Component: 2.2863 (Weighted: 2286.3495)  
NLL Component: 14.8061  
Min Variance: 4.93e-06  
p1=0.254, p2=0.231  
--- Iter [665/2000] ---  
Total Loss: 1966.2091  
MSE Component: 1.9461 (Weighted: 1946.1358)  
NLL Component: 19.9855  
Min Variance: 5.35e-06  
p1=0.254, p2=0.231  
--- Iter [666/2000] ---  
Total Loss: 2719.7932  
MSE Component: 2.6887 (Weighted: 2688.6897)  
NLL Component: 31.0156  
Min Variance: 5.42e-06  
p1=0.254, p2=0.231  
--- Iter [667/2000] ---  
Total Loss: 2269.7295  
MSE Component: 2.2501 (Weighted: 2250.0744)  
NLL Component: 19.5671  
Min Variance: 3.17e-06  
p1=0.254, p2=0.231  
--- Iter [668/2000] ---  
Total Loss: 2098.3945  
MSE Component: 2.0825 (Weighted: 2082.4993)  
NLL Component: 15.8073  
Min Variance: 5.94e-06  
p1=0.254, p2=0.231  
--- Iter [669/2000] ---  
Total Loss: 2257.5071  
MSE Component: 2.2377 (Weighted: 2237.7374)  
NLL Component: 19.6819

```
Min Variance: 1.66e-05
p1=0.254, p2=0.231
--- Iter [670/2000] ---
Total Loss: 3081.6108
MSE Component: 3.0559 (Weighted: 3055.9452)
NLL Component: 25.5778
Min Variance: 5.84e-06
p1=0.254, p2=0.231

--- Validation at iteration 670 ---
Average MSE: 285.7382, Average ANEES: 449.9306
-----
--- Iter [671/2000] ---
Total Loss: 2580.0718
MSE Component: 2.5576 (Weighted: 2557.5981)
NLL Component: 22.3857
Min Variance: 1.20e-05
p1=0.254, p2=0.231
--- Iter [672/2000] ---
Total Loss: 2639.6348
MSE Component: 2.6226 (Weighted: 2622.5677)
NLL Component: 16.9793
Min Variance: 9.77e-06
p1=0.253, p2=0.231
--- Iter [673/2000] ---
Total Loss: 2164.0071
MSE Component: 2.1419 (Weighted: 2141.8555)
NLL Component: 22.0637
Min Variance: 9.29e-06
p1=0.253, p2=0.231
--- Iter [674/2000] ---
Total Loss: 2360.7004
MSE Component: 2.3366 (Weighted: 2336.6036)
NLL Component: 24.0087
Min Variance: 2.97e-06
p1=0.253, p2=0.231
--- Iter [675/2000] ---
Total Loss: 2002.1326
MSE Component: 1.9922 (Weighted: 1992.2463)
NLL Component: 9.7985
Min Variance: 4.18e-06
p1=0.253, p2=0.231
--- Iter [676/2000] ---
Total Loss: 2769.6807
MSE Component: 2.7498 (Weighted: 2749.7694)
NLL Component: 19.8233
Min Variance: 1.28e-05
p1=0.253, p2=0.231
```

```
--- Iter [677/2000] ---
Total Loss: 2945.7998
MSE Component: 2.9314 (Weighted: 2931.3607)
NLL Component: 14.3510
Min Variance: 8.64e-06
p1=0.253, p2=0.231
--- Iter [678/2000] ---
Total Loss: 2774.5708
MSE Component: 2.7585 (Weighted: 2758.5108)
NLL Component: 15.9722
Min Variance: 7.91e-06
p1=0.253, p2=0.231
--- Iter [679/2000] ---
Total Loss: 3184.7952
MSE Component: 3.1641 (Weighted: 3164.1247)
NLL Component: 20.5825
Min Variance: 5.82e-06
p1=0.253, p2=0.231
--- Iter [680/2000] ---
Total Loss: 2221.0552
MSE Component: 2.2072 (Weighted: 2207.2194)
NLL Component: 13.7479
Min Variance: 1.36e-05
p1=0.253, p2=0.231

--- Validation at iteration 680 ---
Average MSE: 331.7854, Average ANEES: 349.9341
-----
--- Iter [681/2000] ---
Total Loss: 3704.3552
MSE Component: 3.6908 (Weighted: 3690.7697)
NLL Component: 13.4976
Min Variance: 1.14e-05
p1=0.253, p2=0.231
--- Iter [682/2000] ---
Total Loss: 7693.5586
MSE Component: 7.6772 (Weighted: 7677.1588)
NLL Component: 16.3118
Min Variance: 8.32e-06
p1=0.253, p2=0.231
--- Iter [683/2000] ---
Total Loss: 4725.9321
MSE Component: 4.7090 (Weighted: 4709.0421)
NLL Component: 16.8021
Min Variance: 1.00e-05
p1=0.253, p2=0.231
--- Iter [684/2000] ---
Total Loss: 5384.6670
```

MSE Component: 5.3636 (Weighted: 5363.5855)  
NLL Component: 20.9938  
Min Variance: 4.91e-06  
p1=0.253, p2=0.231  
--- Iter [685/2000] ---  
Total Loss: 5938.6758  
MSE Component: 5.9189 (Weighted: 5918.8666)  
NLL Component: 19.7213  
Min Variance: 1.10e-05  
p1=0.253, p2=0.231  
--- Iter [686/2000] ---  
Total Loss: 4126.1860  
MSE Component: 4.1075 (Weighted: 4107.5182)  
NLL Component: 18.5803  
Min Variance: 9.95e-06  
p1=0.253, p2=0.231  
--- Iter [687/2000] ---  
Total Loss: 3251.5786  
MSE Component: 3.2355 (Weighted: 3235.5452)  
NLL Component: 15.9455  
Min Variance: 3.55e-06  
p1=0.253, p2=0.231  
--- Iter [688/2000] ---  
Total Loss: 2459.7620  
MSE Component: 2.4434 (Weighted: 2443.3513)  
NLL Component: 16.3229  
Min Variance: 1.15e-05  
p1=0.253, p2=0.231  
--- Iter [689/2000] ---  
Total Loss: 2984.6069  
MSE Component: 2.9635 (Weighted: 2963.4767)  
NLL Component: 21.0424  
Min Variance: 1.24e-05  
p1=0.253, p2=0.231  
--- Iter [690/2000] ---  
Total Loss: 7638.9365  
MSE Component: 7.6183 (Weighted: 7618.2928)  
NLL Component: 20.5555  
Min Variance: 6.28e-06  
p1=0.253, p2=0.231

--- Validation at iteration 690 ---  
Average MSE: 262.4835, Average ANEES: 625.1915

-----  
--- Iter [691/2000] ---  
Total Loss: 7064.8628  
MSE Component: 7.0450 (Weighted: 7045.0091)  
NLL Component: 19.7655

Min Variance: 1.16e-05  
p1=0.253, p2=0.231  
--- Iter [692/2000] ---  
Total Loss: 7414.6401  
MSE Component: 7.3942 (Weighted: 7394.2018)  
NLL Component: 20.3503  
Min Variance: 9.01e-06  
p1=0.253, p2=0.231  
--- Iter [693/2000] ---  
Total Loss: 4627.1045  
MSE Component: 4.6059 (Weighted: 4605.8736)  
NLL Component: 21.1428  
Min Variance: 1.14e-05  
p1=0.253, p2=0.231  
--- Iter [694/2000] ---  
Total Loss: 2896.2432  
MSE Component: 2.8766 (Weighted: 2876.6189)  
NLL Component: 19.5363  
Min Variance: 1.69e-05  
p1=0.253, p2=0.231  
--- Iter [695/2000] ---  
Total Loss: 2959.4070  
MSE Component: 2.9356 (Weighted: 2935.6008)  
NLL Component: 23.7184  
Min Variance: 6.57e-06  
p1=0.253, p2=0.231  
--- Iter [696/2000] ---  
Total Loss: 3682.2634  
MSE Component: 3.6664 (Weighted: 3666.3721)  
NLL Component: 15.8035  
Min Variance: 8.84e-06  
p1=0.253, p2=0.231  
--- Iter [697/2000] ---  
Total Loss: 4479.1084  
MSE Component: 4.4615 (Weighted: 4461.5173)  
NLL Component: 17.5031  
Min Variance: 9.23e-06  
p1=0.253, p2=0.231  
--- Iter [698/2000] ---  
Total Loss: 2584.1338  
MSE Component: 2.5669 (Weighted: 2566.8972)  
NLL Component: 17.1487  
Min Variance: 1.10e-05  
p1=0.253, p2=0.231  
--- Iter [699/2000] ---  
Total Loss: 6277.5205  
MSE Component: 6.2518 (Weighted: 6251.8072)  
NLL Component: 25.6254

```

Min Variance: 1.48e-05
p1=0.253, p2=0.231
--- Iter [700/2000] ---
Total Loss: 3435.6292
MSE Component: 3.4198 (Weighted: 3419.8315)
NLL Component: 15.7097
Min Variance: 1.24e-05
p1=0.253, p2=0.231

--- Validation at iteration 700 ---
Average MSE: 306.0872, Average ANEES: 553.4781
-----
--- Iter [701/2000] ---
Total Loss: 2449.1208
MSE Component: 2.4309 (Weighted: 2430.8946)
NLL Component: 18.1385
Min Variance: 1.05e-05
p1=0.253, p2=0.231
--- Iter [702/2000] ---
Total Loss: 2172.2837
MSE Component: 2.1592 (Weighted: 2159.2107)
NLL Component: 12.9850
Min Variance: 6.74e-06
p1=0.253, p2=0.231
--- Iter [703/2000] ---
Total Loss: 4057.6111
MSE Component: 4.0424 (Weighted: 4042.3603)
NLL Component: 15.1628
Min Variance: 6.99e-06
p1=0.253, p2=0.231
--- Iter [704/2000] ---
Total Loss: 3805.5361
MSE Component: 3.7823 (Weighted: 3782.2738)
NLL Component: 23.1745
Min Variance: 7.19e-06
p1=0.253, p2=0.231
--- Iter [705/2000] ---
Total Loss: 2690.6184
MSE Component: 2.6617 (Weighted: 2661.7353)
NLL Component: 28.7952
Min Variance: 7.04e-06
p1=0.253, p2=0.231
--- Iter [706/2000] ---
Total Loss: 2779.6279
MSE Component: 2.7624 (Weighted: 2762.3951)
NLL Component: 17.1449
Min Variance: 1.02e-05
p1=0.253, p2=0.231

```

```
--- Iter [707/2000] ---
Total Loss: 2718.7109
MSE Component: 2.7048 (Weighted: 2704.8190)
NLL Component: 13.8043
Min Variance: 1.25e-05
p1=0.253, p2=0.231
--- Iter [708/2000] ---
Total Loss: 2617.7930
MSE Component: 2.5964 (Weighted: 2596.4224)
NLL Component: 21.2827
Min Variance: 2.26e-05
p1=0.253, p2=0.231
--- Iter [709/2000] ---
Total Loss: 3373.0535
MSE Component: 3.3558 (Weighted: 3355.7501)
NLL Component: 17.2157
Min Variance: 1.41e-05
p1=0.253, p2=0.231
--- Iter [710/2000] ---
Total Loss: 2663.2378
MSE Component: 2.6451 (Weighted: 2645.0882)
NLL Component: 18.0618
Min Variance: 6.16e-06
p1=0.253, p2=0.231

--- Validation at iteration 710 ---
Average MSE: 345.2188, Average ANEES: 442.5623
-----
--- Iter [711/2000] ---
Total Loss: 3421.3887
MSE Component: 3.4035 (Weighted: 3403.4507)
NLL Component: 17.8501
Min Variance: 4.99e-06
p1=0.253, p2=0.231
--- Iter [712/2000] ---
Total Loss: 2225.3669
MSE Component: 2.2073 (Weighted: 2207.2599)
NLL Component: 18.0190
Min Variance: 5.96e-06
p1=0.253, p2=0.231
--- Iter [713/2000] ---
Total Loss: 2352.7363
MSE Component: 2.3402 (Weighted: 2340.1797)
NLL Component: 12.4686
Min Variance: 1.63e-05
p1=0.253, p2=0.231
--- Iter [714/2000] ---
Total Loss: 2477.1921
```

MSE Component: 2.4601 (Weighted: 2460.0904)  
NLL Component: 17.0140  
Min Variance: 1.21e-05  
p1=0.253, p2=0.231  
--- Iter [715/2000] ---  
Total Loss: 4348.5200  
MSE Component: 4.3258 (Weighted: 4325.8419)  
NLL Component: 22.5906  
Min Variance: 4.17e-06  
p1=0.253, p2=0.231  
--- Iter [716/2000] ---  
Total Loss: 3214.2068  
MSE Component: 3.1942 (Weighted: 3194.2172)  
NLL Component: 19.9016  
Min Variance: 8.93e-06  
p1=0.253, p2=0.231  
--- Iter [717/2000] ---  
Total Loss: 3085.9634  
MSE Component: 3.0711 (Weighted: 3071.1460)  
NLL Component: 14.7296  
Min Variance: 7.55e-06  
p1=0.253, p2=0.231  
--- Iter [718/2000] ---  
Total Loss: 2201.6323  
MSE Component: 2.1867 (Weighted: 2186.6772)  
NLL Component: 14.8673  
Min Variance: 9.24e-06  
p1=0.253, p2=0.231  
--- Iter [719/2000] ---  
Total Loss: 2565.5564  
MSE Component: 2.5408 (Weighted: 2540.8101)  
NLL Component: 24.6583  
Min Variance: 8.28e-06  
p1=0.253, p2=0.231  
--- Iter [720/2000] ---  
Total Loss: 2404.0791  
MSE Component: 2.3943 (Weighted: 2394.3021)  
NLL Component: 9.6888  
Min Variance: 1.05e-05  
p1=0.253, p2=0.231

--- Validation at iteration 720 ---  
Average MSE: 337.4128, Average ANEES: 480.9968

-----  
--- Iter [721/2000] ---  
Total Loss: 2547.3486  
MSE Component: 2.5295 (Weighted: 2529.4943)  
NLL Component: 17.7663

Min Variance: 1.29e-05  
p1=0.253, p2=0.231  
--- Iter [722/2000] ---  
Total Loss: 3327.9180  
MSE Component: 3.3145 (Weighted: 3314.5094)  
NLL Component: 13.3209  
Min Variance: 1.99e-05  
p1=0.253, p2=0.231  
--- Iter [723/2000] ---  
Total Loss: 2551.5676  
MSE Component: 2.5351 (Weighted: 2535.0590)  
NLL Component: 16.4207  
Min Variance: 1.94e-05  
p1=0.253, p2=0.231  
--- Iter [724/2000] ---  
Total Loss: 2385.4094  
MSE Component: 2.3686 (Weighted: 2368.6359)  
NLL Component: 16.6856  
Min Variance: 7.89e-06  
p1=0.253, p2=0.231  
--- Iter [725/2000] ---  
Total Loss: 3048.9114  
MSE Component: 3.0304 (Weighted: 3030.3898)  
NLL Component: 18.4335  
Min Variance: 5.06e-06  
p1=0.253, p2=0.231  
--- Iter [726/2000] ---  
Total Loss: 2510.5466  
MSE Component: 2.4865 (Weighted: 2486.5148)  
NLL Component: 23.9438  
Min Variance: 1.60e-05  
p1=0.253, p2=0.231  
--- Iter [727/2000] ---  
Total Loss: 4034.7173  
MSE Component: 4.0172 (Weighted: 4017.2162)  
NLL Component: 17.4131  
Min Variance: 1.14e-05  
p1=0.253, p2=0.231  
--- Iter [728/2000] ---  
Total Loss: 2804.7139  
MSE Component: 2.7879 (Weighted: 2787.9407)  
NLL Component: 16.6852  
Min Variance: 9.15e-06  
p1=0.253, p2=0.231  
--- Iter [729/2000] ---  
Total Loss: 2416.9424  
MSE Component: 2.3922 (Weighted: 2392.1618)  
NLL Component: 24.6927

```

Min Variance: 6.21e-06
p1=0.253, p2=0.231
--- Iter [730/2000] ---
Total Loss: 2936.3484
MSE Component: 2.9197 (Weighted: 2919.6963)
NLL Component: 16.5642
Min Variance: 1.00e-05
p1=0.253, p2=0.231

--- Validation at iteration 730 ---
Average MSE: 334.2152, Average ANEES: 478.4492
-----
--- Iter [731/2000] ---
Total Loss: 4666.2588
MSE Component: 4.6489 (Weighted: 4648.8614)
NLL Component: 17.3094
Min Variance: 1.29e-05
p1=0.253, p2=0.231
--- Iter [732/2000] ---
Total Loss: 2675.5496
MSE Component: 2.6609 (Weighted: 2660.9449)
NLL Component: 14.5169
Min Variance: 2.13e-05
p1=0.253, p2=0.231
--- Iter [733/2000] ---
Total Loss: 3603.7104
MSE Component: 3.5871 (Weighted: 3587.1403)
NLL Component: 16.4823
Min Variance: 9.16e-06
p1=0.253, p2=0.231
--- Iter [734/2000] ---
Total Loss: 3660.9919
MSE Component: 3.6399 (Weighted: 3639.8532)
NLL Component: 21.0508
Min Variance: 1.08e-05
p1=0.253, p2=0.231
--- Iter [735/2000] ---
Total Loss: 2352.0818
MSE Component: 2.3349 (Weighted: 2334.8515)
NLL Component: 17.1424
Min Variance: 1.32e-05
p1=0.253, p2=0.231
--- Iter [736/2000] ---
Total Loss: 1913.1700
MSE Component: 1.9006 (Weighted: 1900.6064)
NLL Component: 12.4759
Min Variance: 7.65e-06
p1=0.253, p2=0.231

```

```
--- Iter [737/2000] ---
Total Loss: 4758.1270
MSE Component: 4.7372 (Weighted: 4737.2494)
NLL Component: 20.7895
Min Variance: 1.08e-05
p1=0.253, p2=0.231
--- Iter [738/2000] ---
Total Loss: 3849.7744
MSE Component: 3.8319 (Weighted: 3831.9094)
NLL Component: 17.7770
Min Variance: 1.08e-05
p1=0.253, p2=0.231
--- Iter [739/2000] ---
Total Loss: 3490.0500
MSE Component: 3.4681 (Weighted: 3468.0853)
NLL Component: 21.8770
Min Variance: 1.10e-05
p1=0.253, p2=0.231
--- Iter [740/2000] ---
Total Loss: 3727.0706
MSE Component: 3.7054 (Weighted: 3705.3919)
NLL Component: 21.5907
Min Variance: 1.14e-05
p1=0.253, p2=0.231

--- Validation at iteration 740 ---
Average MSE: 277.9489, Average ANEES: 578.2060
-----
--- Iter [741/2000] ---
Total Loss: 3996.5527
MSE Component: 3.9789 (Weighted: 3978.9147)
NLL Component: 17.5500
Min Variance: 8.40e-06
p1=0.253, p2=0.231
--- Iter [742/2000] ---
Total Loss: 3297.5793
MSE Component: 3.2836 (Weighted: 3283.5612)
NLL Component: 13.9301
Min Variance: 7.09e-06
p1=0.253, p2=0.231
--- Iter [743/2000] ---
Total Loss: 1774.3926
MSE Component: 1.7591 (Weighted: 1759.1244)
NLL Component: 15.1805
Min Variance: 2.23e-05
p1=0.253, p2=0.231
--- Iter [744/2000] ---
Total Loss: 3000.9509
```

MSE Component: 2.9872 (Weighted: 2987.2139)  
NLL Component: 13.6491  
Min Variance: 7.77e-06  
p1=0.253, p2=0.231  
--- Iter [745/2000] ---  
Total Loss: 2679.1177  
MSE Component: 2.6607 (Weighted: 2660.6958)  
NLL Component: 18.3340  
Min Variance: 1.26e-05  
p1=0.253, p2=0.231  
--- Iter [746/2000] ---  
Total Loss: 5674.9414  
MSE Component: 5.6601 (Weighted: 5660.0604)  
NLL Component: 14.7929  
Min Variance: 1.49e-05  
p1=0.253, p2=0.231  
--- Iter [747/2000] ---  
Total Loss: 3321.0830  
MSE Component: 3.3031 (Weighted: 3303.1218)  
NLL Component: 17.8733  
Min Variance: 1.25e-05  
p1=0.253, p2=0.231  
--- Iter [748/2000] ---  
Total Loss: 2540.4155  
MSE Component: 2.5262 (Weighted: 2526.1800)  
NLL Component: 14.1476  
Min Variance: 7.66e-06  
p1=0.253, p2=0.231  
--- Iter [749/2000] ---  
Total Loss: 2104.5845  
MSE Component: 2.0815 (Weighted: 2081.5165)  
NLL Component: 22.9801  
Min Variance: 8.24e-06  
p1=0.253, p2=0.231  
--- Iter [750/2000] ---  
Total Loss: 3668.3843  
MSE Component: 3.6495 (Weighted: 3649.4820)  
NLL Component: 18.8145  
Min Variance: 1.42e-05  
p1=0.253, p2=0.231  
  
--- Validation at iteration 750 ---  
Average MSE: 272.2534, Average ANEES: 586.5477

---

--- Iter [751/2000] ---  
Total Loss: 3798.6484  
MSE Component: 3.7773 (Weighted: 3777.3297)  
NLL Component: 21.2310

Min Variance: 1.02e-05  
p1=0.253, p2=0.231  
--- Iter [752/2000] ---  
Total Loss: 4097.1445  
MSE Component: 4.0765 (Weighted: 4076.5033)  
NLL Component: 20.5537  
Min Variance: 1.74e-05  
p1=0.253, p2=0.231  
--- Iter [753/2000] ---  
Total Loss: 3576.7788  
MSE Component: 3.5564 (Weighted: 3556.4382)  
NLL Component: 20.2527  
Min Variance: 1.05e-05  
p1=0.253, p2=0.231  
--- Iter [754/2000] ---  
Total Loss: 3336.9131  
MSE Component: 3.3222 (Weighted: 3322.2058)  
NLL Component: 14.6193  
Min Variance: 1.03e-05  
p1=0.253, p2=0.231  
--- Iter [755/2000] ---  
Total Loss: 2483.6555  
MSE Component: 2.4639 (Weighted: 2463.8977)  
NLL Component: 19.6700  
Min Variance: 6.91e-06  
p1=0.253, p2=0.231  
--- Iter [756/2000] ---  
Total Loss: 2284.1204  
MSE Component: 2.2616 (Weighted: 2261.5592)  
NLL Component: 22.4731  
Min Variance: 1.45e-05  
p1=0.253, p2=0.231  
--- Iter [757/2000] ---  
Total Loss: 2666.1697  
MSE Component: 2.6481 (Weighted: 2648.1247)  
NLL Component: 17.9569  
Min Variance: 1.72e-05  
p1=0.253, p2=0.231  
--- Iter [758/2000] ---  
Total Loss: 2771.9993  
MSE Component: 2.7546 (Weighted: 2754.5514)  
NLL Component: 17.3598  
Min Variance: 2.16e-05  
p1=0.253, p2=0.231  
--- Iter [759/2000] ---  
Total Loss: 2328.1060  
MSE Component: 2.3163 (Weighted: 2316.2699)  
NLL Component: 11.7484

```
Min Variance: 1.87e-05
p1=0.253, p2=0.231
--- Iter [760/2000] ---
Total Loss: 2233.8765
MSE Component: 2.2124 (Weighted: 2212.3668)
NLL Component: 21.4219
Min Variance: 8.55e-06
p1=0.253, p2=0.231

--- Validation at iteration 760 ---
Average MSE: 285.5896, Average ANEES: 534.3270
-----
--- Iter [761/2000] ---
Total Loss: 2852.1138
MSE Component: 2.8364 (Weighted: 2836.3795)
NLL Component: 15.6462
Min Variance: 1.27e-05
p1=0.253, p2=0.231
--- Iter [762/2000] ---
Total Loss: 2868.8457
MSE Component: 2.8449 (Weighted: 2844.8720)
NLL Component: 23.8857
Min Variance: 1.47e-06
p1=0.253, p2=0.231
--- Iter [763/2000] ---
Total Loss: 3801.8123
MSE Component: 3.7855 (Weighted: 3785.4807)
NLL Component: 16.2437
Min Variance: 7.06e-06
p1=0.253, p2=0.231
--- Iter [764/2000] ---
Total Loss: 4741.1162
MSE Component: 4.7256 (Weighted: 4725.6355)
NLL Component: 15.3925
Min Variance: 6.26e-06
p1=0.253, p2=0.231
--- Iter [765/2000] ---
Total Loss: 2086.9326
MSE Component: 2.0675 (Weighted: 2067.5278)
NLL Component: 19.3170
Min Variance: 9.10e-06
p1=0.253, p2=0.231
--- Iter [766/2000] ---
Total Loss: 2170.7930
MSE Component: 2.1550 (Weighted: 2154.9978)
NLL Component: 15.7072
Min Variance: 9.03e-06
p1=0.253, p2=0.231
```

```

--- Iter [767/2000] ---
Total Loss: 2394.4731
MSE Component: 2.3733 (Weighted: 2373.2650)
NLL Component: 21.1202
Min Variance: 5.18e-06
p1=0.253, p2=0.231
--- Iter [768/2000] ---
Total Loss: 3467.8298
MSE Component: 3.4509 (Weighted: 3450.9096)
NLL Component: 16.8323
Min Variance: 1.09e-05
p1=0.253, p2=0.231
--- Iter [769/2000] ---
Total Loss: 3371.3928
MSE Component: 3.3514 (Weighted: 3351.3854)
NLL Component: 19.9198
Min Variance: 6.85e-06
p1=0.253, p2=0.231
--- Iter [770/2000] ---
Total Loss: 4451.7012
MSE Component: 4.4339 (Weighted: 4433.8670)
NLL Component: 17.7463
Min Variance: 1.49e-05
p1=0.253, p2=0.231

--- Validation at iteration 770 ---
Average MSE: 341.2595, Average ANEES: 475.1324
-----
--- Iter [771/2000] ---
Total Loss: 5278.0352
MSE Component: 5.2633 (Weighted: 5263.3491)
NLL Component: 14.5980
Min Variance: 1.26e-05
p1=0.253, p2=0.231
--- Iter [772/2000] ---
Total Loss: 3777.2998
MSE Component: 3.7627 (Weighted: 3762.7463)
NLL Component: 14.4657
Min Variance: 1.13e-05
p1=0.253, p2=0.231
--- Iter [773/2000] ---
Total Loss: 2212.7793
MSE Component: 2.2005 (Weighted: 2200.4912)
NLL Component: 12.2003
Min Variance: 1.98e-05
p1=0.253, p2=0.231
--- Iter [774/2000] ---
Total Loss: 2915.9141

```

MSE Component: 2.8881 (Weighted: 2888.0923)  
NLL Component: 27.7340  
Min Variance: 3.62e-06  
p1=0.253, p2=0.231  
--- Iter [775/2000] ---  
Total Loss: 2148.9761  
MSE Component: 2.1320 (Weighted: 2131.9706)  
NLL Component: 16.9176  
Min Variance: 9.64e-06  
p1=0.253, p2=0.231  
--- Iter [776/2000] ---  
Total Loss: 4637.2358  
MSE Component: 4.6151 (Weighted: 4615.0875)  
NLL Component: 22.0608  
Min Variance: 2.46e-06  
p1=0.253, p2=0.231  
--- Iter [777/2000] ---  
Total Loss: 3867.5854  
MSE Component: 3.8457 (Weighted: 3845.7451)  
NLL Component: 21.7524  
Min Variance: 1.10e-05  
p1=0.252, p2=0.231  
--- Iter [778/2000] ---  
Total Loss: 4091.7021  
MSE Component: 4.0765 (Weighted: 4076.5028)  
NLL Component: 15.1115  
Min Variance: 1.28e-05  
p1=0.252, p2=0.231  
--- Iter [779/2000] ---  
Total Loss: 2124.5764  
MSE Component: 2.1056 (Weighted: 2105.6166)  
NLL Component: 18.8722  
Min Variance: 1.49e-05  
p1=0.252, p2=0.231  
--- Iter [780/2000] ---  
Total Loss: 2382.4182  
MSE Component: 2.3659 (Weighted: 2365.8805)  
NLL Component: 16.4500  
Min Variance: 1.02e-05  
p1=0.252, p2=0.231  
  
--- Validation at iteration 780 ---  
Average MSE: 317.6539, Average ANEES: 472.0672

---

--- Iter [781/2000] ---  
Total Loss: 1905.4667  
MSE Component: 1.8867 (Weighted: 1886.6963)  
NLL Component: 18.6826

Min Variance: 1.57e-05  
p1=0.252, p2=0.231  
--- Iter [782/2000] ---  
Total Loss: 4022.3071  
MSE Component: 4.0068 (Weighted: 4006.7506)  
NLL Component: 15.4687  
Min Variance: 1.11e-05  
p1=0.252, p2=0.231  
--- Iter [783/2000] ---  
Total Loss: 2651.6689  
MSE Component: 2.6345 (Weighted: 2634.5065)  
NLL Component: 17.0746  
Min Variance: 1.55e-05  
p1=0.252, p2=0.231  
--- Iter [784/2000] ---  
Total Loss: 2670.2605  
MSE Component: 2.6563 (Weighted: 2656.2641)  
NLL Component: 13.9084  
Min Variance: 1.19e-05  
p1=0.252, p2=0.231  
--- Iter [785/2000] ---  
Total Loss: 2368.9792  
MSE Component: 2.3548 (Weighted: 2354.7843)  
NLL Component: 14.1072  
Min Variance: 9.34e-06  
p1=0.252, p2=0.231  
--- Iter [786/2000] ---  
Total Loss: 2229.4197  
MSE Component: 2.2108 (Weighted: 2210.7823)  
NLL Component: 18.5495  
Min Variance: 1.20e-05  
p1=0.252, p2=0.231  
--- Iter [787/2000] ---  
Total Loss: 2446.7686  
MSE Component: 2.4299 (Weighted: 2429.8675)  
NLL Component: 16.8133  
Min Variance: 1.48e-05  
p1=0.252, p2=0.231  
--- Iter [788/2000] ---  
Total Loss: 2231.1892  
MSE Component: 2.2114 (Weighted: 2211.3895)  
NLL Component: 19.7118  
Min Variance: 1.57e-05  
p1=0.252, p2=0.231  
--- Iter [789/2000] ---  
Total Loss: 2886.7388  
MSE Component: 2.8735 (Weighted: 2873.5464)  
NLL Component: 13.1045

```

Min Variance: 2.17e-05
p1=0.252, p2=0.231
--- Iter [790/2000] ---
Total Loss: 2303.1711
MSE Component: 2.2883 (Weighted: 2288.2838)
NLL Component: 14.7992
Min Variance: 1.34e-05
p1=0.252, p2=0.231

--- Validation at iteration 790 ---
Average MSE: 281.7083, Average ANEES: 526.1821
-----
--- Iter [791/2000] ---
Total Loss: 1964.9937
MSE Component: 1.9486 (Weighted: 1948.6082)
NLL Component: 16.2977
Min Variance: 9.28e-06
p1=0.252, p2=0.231
--- Iter [792/2000] ---
Total Loss: 2319.9934
MSE Component: 2.2940 (Weighted: 2294.0190)
NLL Component: 25.8864
Min Variance: 1.98e-05
p1=0.252, p2=0.231
--- Iter [793/2000] ---
Total Loss: 2465.3809
MSE Component: 2.4466 (Weighted: 2446.5909)
NLL Component: 18.7022
Min Variance: 5.92e-06
p1=0.252, p2=0.231
--- Iter [794/2000] ---
Total Loss: 2113.7039
MSE Component: 2.1003 (Weighted: 2100.2562)
NLL Component: 13.3599
Min Variance: 4.48e-06
p1=0.252, p2=0.231
--- Iter [795/2000] ---
Total Loss: 2756.5247
MSE Component: 2.7382 (Weighted: 2738.2202)
NLL Component: 18.2166
Min Variance: 1.31e-05
p1=0.252, p2=0.231
--- Iter [796/2000] ---
Total Loss: 2019.2393
MSE Component: 1.9975 (Weighted: 1997.5016)
NLL Component: 21.6499
Min Variance: 4.72e-06
p1=0.252, p2=0.231

```

```
--- Iter [797/2000] ---
Total Loss: 2924.1504
MSE Component: 2.9032 (Weighted: 2903.2118)
NLL Component: 20.8507
Min Variance: 7.83e-06
p1=0.252, p2=0.231
--- Iter [798/2000] ---
Total Loss: 2215.5544
MSE Component: 2.1979 (Weighted: 2197.9089)
NLL Component: 17.5575
Min Variance: 2.13e-05
p1=0.252, p2=0.231
--- Iter [799/2000] ---
Total Loss: 2521.1250
MSE Component: 2.5025 (Weighted: 2502.5167)
NLL Component: 18.5202
Min Variance: 1.12e-05
p1=0.252, p2=0.231
--- Iter [800/2000] ---
Total Loss: 2513.9656
MSE Component: 2.4981 (Weighted: 2498.0941)
NLL Component: 15.7837
Min Variance: 5.77e-06
p1=0.252, p2=0.231

--- Validation at iteration 800 ---
Average MSE: 245.9419, Average ANEES: 455.8888
-----
--- Iter [801/2000] ---
Total Loss: 2558.8215
MSE Component: 2.5359 (Weighted: 2535.9318)
NLL Component: 22.8017
Min Variance: 5.42e-06
p1=0.252, p2=0.231
--- Iter [802/2000] ---
Total Loss: 2740.0559
MSE Component: 2.7211 (Weighted: 2721.0658)
NLL Component: 18.9024
Min Variance: 1.04e-05
p1=0.252, p2=0.231
--- Iter [803/2000] ---
Total Loss: 2091.5317
MSE Component: 2.0771 (Weighted: 2077.0710)
NLL Component: 14.3729
Min Variance: 1.48e-05
p1=0.252, p2=0.230
--- Iter [804/2000] ---
Total Loss: 2594.5618
```

MSE Component: 2.5806 (Weighted: 2580.6003)  
NLL Component: 13.8736  
Min Variance: 6.58e-06  
p1=0.252, p2=0.230  
--- Iter [805/2000] ---  
Total Loss: 2709.4597  
MSE Component: 2.6816 (Weighted: 2681.6328)  
NLL Component: 27.7390  
Min Variance: 6.98e-06  
p1=0.252, p2=0.230  
--- Iter [806/2000] ---  
Total Loss: 1932.6194  
MSE Component: 1.9161 (Weighted: 1916.0832)  
NLL Component: 16.4483  
Min Variance: 1.19e-05  
p1=0.252, p2=0.230  
--- Iter [807/2000] ---  
Total Loss: 1840.9539  
MSE Component: 1.8271 (Weighted: 1827.1338)  
NLL Component: 13.7323  
Min Variance: 1.37e-05  
p1=0.252, p2=0.230  
--- Iter [808/2000] ---  
Total Loss: 2238.4258  
MSE Component: 2.2199 (Weighted: 2219.8682)  
NLL Component: 18.4697  
Min Variance: 1.14e-05  
p1=0.252, p2=0.230  
--- Iter [809/2000] ---  
Total Loss: 2771.8030  
MSE Component: 2.7576 (Weighted: 2757.6439)  
NLL Component: 14.0712  
Min Variance: 6.00e-06  
p1=0.252, p2=0.230  
--- Iter [810/2000] ---  
Total Loss: 2499.6106  
MSE Component: 2.4766 (Weighted: 2476.5525)  
NLL Component: 22.9702  
Min Variance: 8.86e-06  
p1=0.252, p2=0.230  
  
--- Validation at iteration 810 ---  
Average MSE: 288.6045, Average ANEES: 557.4687

---

--- Iter [811/2000] ---  
Total Loss: 1927.6696  
MSE Component: 1.9125 (Weighted: 1912.4645)  
NLL Component: 15.1173

Min Variance: 4.68e-06  
p1=0.252, p2=0.230  
--- Iter [812/2000] ---  
Total Loss: 2547.4888  
MSE Component: 2.5247 (Weighted: 2524.7381)  
NLL Component: 22.6628  
Min Variance: 8.89e-06  
p1=0.252, p2=0.230  
--- Iter [813/2000] ---  
Total Loss: 2820.1504  
MSE Component: 2.7994 (Weighted: 2799.3982)  
NLL Component: 20.6644  
Min Variance: 1.14e-05  
p1=0.252, p2=0.230  
--- Iter [814/2000] ---  
Total Loss: 2293.6597  
MSE Component: 2.2800 (Weighted: 2280.0276)  
NLL Component: 13.5442  
Min Variance: 2.23e-05  
p1=0.252, p2=0.230  
--- Iter [815/2000] ---  
Total Loss: 2833.9778  
MSE Component: 2.8180 (Weighted: 2818.0165)  
NLL Component: 15.8733  
Min Variance: 7.58e-06  
p1=0.252, p2=0.230  
--- Iter [816/2000] ---  
Total Loss: 5259.6460  
MSE Component: 5.2415 (Weighted: 5241.4508)  
NLL Component: 18.1075  
Min Variance: 8.98e-06  
p1=0.252, p2=0.230  
--- Iter [817/2000] ---  
Total Loss: 3031.8120  
MSE Component: 3.0152 (Weighted: 3015.2233)  
NLL Component: 16.5011  
Min Variance: 6.69e-06  
p1=0.252, p2=0.230  
--- Iter [818/2000] ---  
Total Loss: 2027.9740  
MSE Component: 2.0146 (Weighted: 2014.5719)  
NLL Component: 13.3144  
Min Variance: 1.67e-05  
p1=0.252, p2=0.230  
--- Iter [819/2000] ---  
Total Loss: 2305.6265  
MSE Component: 2.2912 (Weighted: 2291.1849)  
NLL Component: 14.3538

```
Min Variance: 6.01e-06
p1=0.252, p2=0.230
--- Iter [820/2000] ---
Total Loss: 3955.3555
MSE Component: 3.9342 (Weighted: 3934.1812)
NLL Component: 21.0865
Min Variance: 1.37e-05
p1=0.252, p2=0.230

--- Validation at iteration 820 ---
Average MSE: 326.0136, Average ANEES: 466.6788
-----
--- Iter [821/2000] ---
Total Loss: 2132.2773
MSE Component: 2.1192 (Weighted: 2119.1702)
NLL Component: 13.0193
Min Variance: 1.87e-05
p1=0.252, p2=0.230
--- Iter [822/2000] ---
Total Loss: 3362.4189
MSE Component: 3.3473 (Weighted: 3347.2626)
NLL Component: 15.0684
Min Variance: 6.76e-06
p1=0.252, p2=0.230
--- Iter [823/2000] ---
Total Loss: 2541.0732
MSE Component: 2.5295 (Weighted: 2529.5439)
NLL Component: 11.4413
Min Variance: 7.40e-06
p1=0.252, p2=0.230
--- Iter [824/2000] ---
Total Loss: 2035.1152
MSE Component: 2.0199 (Weighted: 2019.9432)
NLL Component: 15.0842
Min Variance: 1.00e-05
p1=0.252, p2=0.230
--- Iter [825/2000] ---
Total Loss: 2860.2261
MSE Component: 2.8459 (Weighted: 2845.8939)
NLL Component: 14.2443
Min Variance: 1.25e-05
p1=0.252, p2=0.230
--- Iter [826/2000] ---
Total Loss: 2789.3076
MSE Component: 2.7714 (Weighted: 2771.4338)
NLL Component: 17.7858
Min Variance: 1.39e-05
p1=0.252, p2=0.230
```

```
--- Iter [827/2000] ---
Total Loss: 2410.2937
MSE Component: 2.3930 (Weighted: 2393.0099)
NLL Component: 17.1958
Min Variance: 9.33e-06
p1=0.252, p2=0.230
--- Iter [828/2000] ---
Total Loss: 2928.8005
MSE Component: 2.9031 (Weighted: 2903.1374)
NLL Component: 25.5751
Min Variance: 1.00e-05
p1=0.252, p2=0.230
--- Iter [829/2000] ---
Total Loss: 2016.6771
MSE Component: 2.0007 (Weighted: 2000.6719)
NLL Component: 15.9175
Min Variance: 9.32e-06
p1=0.252, p2=0.230
--- Iter [830/2000] ---
Total Loss: 2375.0718
MSE Component: 2.3641 (Weighted: 2364.1014)
NLL Component: 10.8826
Min Variance: 8.82e-06
p1=0.252, p2=0.230

--- Validation at iteration 830 ---
Average MSE: 277.2944, Average ANEES: 628.0983
-----
--- Iter [831/2000] ---
Total Loss: 2269.7634
MSE Component: 2.2543 (Weighted: 2254.2520)
NLL Component: 15.4236
Min Variance: 5.33e-06
p1=0.252, p2=0.230
--- Iter [832/2000] ---
Total Loss: 3139.2134
MSE Component: 3.1174 (Weighted: 3117.3615)
NLL Component: 21.7640
Min Variance: 1.19e-05
p1=0.252, p2=0.230
--- Iter [833/2000] ---
Total Loss: 2684.6582
MSE Component: 2.6632 (Weighted: 2663.1932)
NLL Component: 21.3772
Min Variance: 3.33e-06
p1=0.252, p2=0.230
--- Iter [834/2000] ---
Total Loss: 2202.3564
```

MSE Component: 2.1884 (Weighted: 2188.3550)  
NLL Component: 13.9136  
Min Variance: 1.67e-05  
p1=0.252, p2=0.230  
--- Iter [835/2000] ---  
Total Loss: 2518.1494  
MSE Component: 2.5017 (Weighted: 2501.7126)  
NLL Component: 16.3489  
Min Variance: 1.28e-05  
p1=0.252, p2=0.230  
--- Iter [836/2000] ---  
Total Loss: 2714.8091  
MSE Component: 2.6953 (Weighted: 2695.3087)  
NLL Component: 19.4126  
Min Variance: 1.32e-05  
p1=0.252, p2=0.230  
--- Iter [837/2000] ---  
Total Loss: 2687.0093  
MSE Component: 2.6673 (Weighted: 2667.3267)  
NLL Component: 19.5947  
Min Variance: 1.12e-05  
p1=0.252, p2=0.230  
--- Iter [838/2000] ---  
Total Loss: 2599.9390  
MSE Component: 2.5780 (Weighted: 2577.9557)  
NLL Component: 21.8952  
Min Variance: 7.12e-06  
p1=0.252, p2=0.230  
--- Iter [839/2000] ---  
Total Loss: 2032.4342  
MSE Component: 2.0141 (Weighted: 2014.1294)  
NLL Component: 18.2171  
Min Variance: 4.53e-06  
p1=0.252, p2=0.230  
--- Iter [840/2000] ---  
Total Loss: 2210.7822  
MSE Component: 2.1995 (Weighted: 2199.5170)  
NLL Component: 11.1771  
Min Variance: 1.94e-05  
p1=0.252, p2=0.230  
  
--- Validation at iteration 840 ---  
Average MSE: 272.5352, Average ANEES: 615.3119

---

--- Iter [841/2000] ---  
Total Loss: 1897.8237  
MSE Component: 1.8836 (Weighted: 1883.5876)  
NLL Component: 14.1483

Min Variance: 1.25e-05  
p1=0.252, p2=0.230  
--- Iter [842/2000] ---  
Total Loss: 2205.1648  
MSE Component: 2.1919 (Weighted: 2191.8542)  
NLL Component: 13.2227  
Min Variance: 8.82e-06  
p1=0.252, p2=0.230  
--- Iter [843/2000] ---  
Total Loss: 2663.6499  
MSE Component: 2.6456 (Weighted: 2645.5514)  
NLL Component: 18.0105  
Min Variance: 9.05e-06  
p1=0.252, p2=0.230  
--- Iter [844/2000] ---  
Total Loss: 2141.6362  
MSE Component: 2.1254 (Weighted: 2125.4075)  
NLL Component: 16.1409  
Min Variance: 3.74e-06  
p1=0.252, p2=0.230  
--- Iter [845/2000] ---  
Total Loss: 2031.4050  
MSE Component: 2.0157 (Weighted: 2015.6689)  
NLL Component: 15.6485  
Min Variance: 1.55e-05  
p1=0.252, p2=0.230  
--- Iter [846/2000] ---  
Total Loss: 3151.7532  
MSE Component: 3.1336 (Weighted: 3133.5723)  
NLL Component: 18.0929  
Min Variance: 8.47e-06  
p1=0.252, p2=0.230  
--- Iter [847/2000] ---  
Total Loss: 3060.6533  
MSE Component: 3.0469 (Weighted: 3046.9234)  
NLL Component: 13.6420  
Min Variance: 4.40e-06  
p1=0.252, p2=0.230  
--- Iter [848/2000] ---  
Total Loss: 1989.6495  
MSE Component: 1.9731 (Weighted: 1973.0619)  
NLL Component: 16.4999  
Min Variance: 1.45e-05  
p1=0.252, p2=0.230  
--- Iter [849/2000] ---  
Total Loss: 1661.8575  
MSE Component: 1.6424 (Weighted: 1642.3775)  
NLL Component: 19.3924

```

Min Variance: 9.57e-06
p1=0.252, p2=0.230
--- Iter [850/2000] ---
Total Loss: 2062.0481
MSE Component: 2.0484 (Weighted: 2048.3983)
NLL Component: 13.5620
Min Variance: 5.80e-06
p1=0.252, p2=0.230

--- Validation at iteration 850 ---
Average MSE: 271.8113, Average ANEES: 651.3135
-----
--- Iter [851/2000] ---
Total Loss: 1938.1810
MSE Component: 1.9230 (Weighted: 1922.9711)
NLL Component: 15.1222
Min Variance: 1.71e-05
p1=0.252, p2=0.230
--- Iter [852/2000] ---
Total Loss: 2081.0081
MSE Component: 2.0595 (Weighted: 2059.4969)
NLL Component: 21.4232
Min Variance: 8.36e-06
p1=0.252, p2=0.230
--- Iter [853/2000] ---
Total Loss: 2446.9563
MSE Component: 2.4234 (Weighted: 2423.4016)
NLL Component: 23.4667
Min Variance: 1.13e-05
p1=0.252, p2=0.230
--- Iter [854/2000] ---
Total Loss: 2402.1648
MSE Component: 2.3901 (Weighted: 2390.0776)
NLL Component: 11.9994
Min Variance: 1.02e-05
p1=0.252, p2=0.230
--- Iter [855/2000] ---
Total Loss: 1867.9906
MSE Component: 1.8523 (Weighted: 1852.3290)
NLL Component: 15.5739
Min Variance: 1.13e-05
p1=0.252, p2=0.230
--- Iter [856/2000] ---
Total Loss: 1823.1039
MSE Component: 1.8066 (Weighted: 1806.6487)
NLL Component: 16.3675
Min Variance: 7.25e-06
p1=0.252, p2=0.230

```

```
--- Iter [857/2000] ---
Total Loss: 3534.5291
MSE Component: 3.5168 (Weighted: 3516.7704)
NLL Component: 17.6709
Min Variance: 1.15e-05
p1=0.252, p2=0.230
--- Iter [858/2000] ---
Total Loss: 3490.7219
MSE Component: 3.4756 (Weighted: 3475.5988)
NLL Component: 15.0351
Min Variance: 1.39e-05
p1=0.252, p2=0.230
--- Iter [859/2000] ---
Total Loss: 2505.6702
MSE Component: 2.4882 (Weighted: 2488.1575)
NLL Component: 17.4248
Min Variance: 6.37e-06
p1=0.252, p2=0.230
--- Iter [860/2000] ---
Total Loss: 3033.1050
MSE Component: 3.0194 (Weighted: 3019.4330)
NLL Component: 13.5839
Min Variance: 1.65e-05
p1=0.252, p2=0.230

--- Validation at iteration 860 ---
Average MSE: 265.6339, Average ANEES: 486.4980
-----
--- Iter [861/2000] ---
Total Loss: 2250.1345
MSE Component: 2.2340 (Weighted: 2234.0035)
NLL Component: 16.0429
Min Variance: 9.04e-06
p1=0.252, p2=0.230
--- Iter [862/2000] ---
Total Loss: 1666.7218
MSE Component: 1.6515 (Weighted: 1651.4572)
NLL Component: 15.1769
Min Variance: 9.78e-06
p1=0.252, p2=0.230
--- Iter [863/2000] ---
Total Loss: 2182.3242
MSE Component: 2.1662 (Weighted: 2166.1513)
NLL Component: 16.0849
Min Variance: 1.22e-05
p1=0.252, p2=0.230
--- Iter [864/2000] ---
Total Loss: 2130.0398
```

MSE Component: 2.1165 (Weighted: 2116.5304)  
NLL Component: 13.4214  
Min Variance: 1.69e-05  
p1=0.252, p2=0.230  
--- Iter [865/2000] ---  
Total Loss: 1878.3347  
MSE Component: 1.8564 (Weighted: 1856.4068)  
NLL Component: 21.8401  
Min Variance: 8.58e-06  
p1=0.252, p2=0.230  
--- Iter [866/2000] ---  
Total Loss: 1939.5787  
MSE Component: 1.9265 (Weighted: 1926.4704)  
NLL Component: 13.0205  
Min Variance: 1.00e-05  
p1=0.252, p2=0.230  
--- Iter [867/2000] ---  
Total Loss: 2161.9873  
MSE Component: 2.1483 (Weighted: 2148.3388)  
NLL Component: 13.5605  
Min Variance: 2.26e-05  
p1=0.252, p2=0.230  
--- Iter [868/2000] ---  
Total Loss: 1946.6581  
MSE Component: 1.9320 (Weighted: 1931.9568)  
NLL Component: 14.6136  
Min Variance: 1.10e-05  
p1=0.252, p2=0.230  
--- Iter [869/2000] ---  
Total Loss: 2227.6304  
MSE Component: 2.2127 (Weighted: 2212.6904)  
NLL Component: 14.8522  
Min Variance: 1.17e-05  
p1=0.252, p2=0.230  
--- Iter [870/2000] ---  
Total Loss: 1997.9833  
MSE Component: 1.9779 (Weighted: 1977.8907)  
NLL Component: 20.0047  
Min Variance: 1.32e-05  
p1=0.252, p2=0.230  
  
--- Validation at iteration 870 ---  
Average MSE: 260.4490, Average ANEES: 597.6205

---

--- Iter [871/2000] ---  
Total Loss: 1659.3558  
MSE Component: 1.6472 (Weighted: 1647.1913)  
NLL Component: 12.0767

Min Variance: 1.87e-05  
p1=0.252, p2=0.230  
--- Iter [872/2000] ---  
Total Loss: 1789.7532  
MSE Component: 1.7751 (Weighted: 1775.0748)  
NLL Component: 14.5905  
Min Variance: 1.62e-05  
p1=0.252, p2=0.230  
--- Iter [873/2000] ---  
Total Loss: 2143.8352  
MSE Component: 2.1270 (Weighted: 2126.9753)  
NLL Component: 16.7723  
Min Variance: 1.02e-05  
p1=0.252, p2=0.230  
--- Iter [874/2000] ---  
Total Loss: 2426.2490  
MSE Component: 2.4103 (Weighted: 2410.3193)  
NLL Component: 15.8421  
Min Variance: 2.18e-05  
p1=0.252, p2=0.230  
--- Iter [875/2000] ---  
Total Loss: 2505.2458  
MSE Component: 2.4863 (Weighted: 2486.2990)  
NLL Component: 18.8592  
Min Variance: 7.21e-06  
p1=0.252, p2=0.230  
--- Iter [876/2000] ---  
Total Loss: 2335.1445  
MSE Component: 2.3191 (Weighted: 2319.0653)  
NLL Component: 15.9913  
Min Variance: 2.01e-05  
p1=0.252, p2=0.230  
--- Iter [877/2000] ---  
Total Loss: 1995.6320  
MSE Component: 1.9805 (Weighted: 1980.5095)  
NLL Component: 15.0346  
Min Variance: 3.33e-06  
p1=0.252, p2=0.230  
--- Iter [878/2000] ---  
Total Loss: 1891.1146  
MSE Component: 1.8779 (Weighted: 1877.9290)  
NLL Component: 13.0979  
Min Variance: 1.01e-05  
p1=0.251, p2=0.230  
--- Iter [879/2000] ---  
Total Loss: 2341.4072  
MSE Component: 2.3219 (Weighted: 2321.8694)  
NLL Component: 19.4502

```
Min Variance: 1.52e-05
p1=0.251, p2=0.230
--- Iter [880/2000] ---
Total Loss: 2121.6333
MSE Component: 2.1068 (Weighted: 2106.7796)
NLL Component: 14.7662
Min Variance: 1.13e-05
p1=0.251, p2=0.230

--- Validation at iteration 880 ---
Average MSE: 263.3764, Average ANEES: 569.3655
-----
--- Iter [881/2000] ---
Total Loss: 2730.5938
MSE Component: 2.7185 (Weighted: 2718.5466)
NLL Component: 11.9595
Min Variance: 1.05e-05
p1=0.251, p2=0.230
--- Iter [882/2000] ---
Total Loss: 2336.7468
MSE Component: 2.3196 (Weighted: 2319.5655)
NLL Component: 17.0937
Min Variance: 7.11e-06
p1=0.251, p2=0.230
--- Iter [883/2000] ---
Total Loss: 2336.1470
MSE Component: 2.3181 (Weighted: 2318.0971)
NLL Component: 17.9622
Min Variance: 9.42e-06
p1=0.251, p2=0.230
--- Iter [884/2000] ---
Total Loss: 1939.7407
MSE Component: 1.9235 (Weighted: 1923.5139)
NLL Component: 16.1390
Min Variance: 9.61e-06
p1=0.251, p2=0.230
--- Iter [885/2000] ---
Total Loss: 1791.7461
MSE Component: 1.7790 (Weighted: 1778.9969)
NLL Component: 12.6613
Min Variance: 5.64e-06
p1=0.251, p2=0.230
--- Iter [886/2000] ---
Total Loss: 2003.4729
MSE Component: 1.9883 (Weighted: 1988.3083)
NLL Component: 15.0767
Min Variance: 5.67e-06
p1=0.251, p2=0.230
```

```
--- Iter [887/2000] ---
Total Loss: 2658.6111
MSE Component: 2.6400 (Weighted: 2639.9732)
NLL Component: 18.5504
Min Variance: 1.89e-05
p1=0.251, p2=0.230
--- Iter [888/2000] ---
Total Loss: 3270.8745
MSE Component: 3.2573 (Weighted: 3257.2951)
NLL Component: 13.4916
Min Variance: 1.10e-05
p1=0.251, p2=0.230
--- Iter [889/2000] ---
Total Loss: 2262.4668
MSE Component: 2.2425 (Weighted: 2242.4839)
NLL Component: 19.8953
Min Variance: 4.77e-06
p1=0.251, p2=0.230
--- Iter [890/2000] ---
Total Loss: 2025.0531
MSE Component: 2.0071 (Weighted: 2007.1208)
NLL Component: 17.8445
Min Variance: 8.08e-06
p1=0.251, p2=0.230

--- Validation at iteration 890 ---
Average MSE: 261.5341, Average ANEES: 601.3256
-----
--- Iter [891/2000] ---
Total Loss: 2635.8960
MSE Component: 2.6231 (Weighted: 2623.1143)
NLL Component: 12.6941
Min Variance: 1.00e-05
p1=0.251, p2=0.230
--- Iter [892/2000] ---
Total Loss: 1861.8276
MSE Component: 1.8498 (Weighted: 1849.8033)
NLL Component: 11.9365
Min Variance: 8.09e-06
p1=0.251, p2=0.230
--- Iter [893/2000] ---
Total Loss: 4040.4578
MSE Component: 4.0276 (Weighted: 4027.6098)
NLL Component: 12.7602
Min Variance: 1.07e-05
p1=0.251, p2=0.230
--- Iter [894/2000] ---
Total Loss: 2892.4226
```

MSE Component: 2.8733 (Weighted: 2873.3017)  
 NLL Component: 19.0333  
 Min Variance: 1.30e-06  
 p1=0.251, p2=0.230  
 --- Iter [895/2000] ---  
 Total Loss: 2048.8240  
 MSE Component: 2.0367 (Weighted: 2036.7489)  
 NLL Component: 11.9873  
 Min Variance: 3.49e-06  
 p1=0.251, p2=0.230  
 --- Iter [896/2000] ---  
 Total Loss: 2841.2471  
 MSE Component: 2.8203 (Weighted: 2820.3497)  
 NLL Component: 20.8099  
 Min Variance: 7.41e-06  
 p1=0.251, p2=0.230  
 --- Iter [897/2000] ---  
 Total Loss: 2555.7544  
 MSE Component: 2.5415 (Weighted: 2541.4851)  
 NLL Component: 14.1816  
 Min Variance: 6.20e-06  
 p1=0.251, p2=0.230  
 --- Iter [898/2000] ---  
 Total Loss: 2725.6704  
 MSE Component: 2.7049 (Weighted: 2704.9026)  
 NLL Component: 20.6801  
 Min Variance: 7.66e-06  
 p1=0.251, p2=0.230  
 --- Iter [899/2000] ---  
 Total Loss: 4036.7727  
 MSE Component: 4.0187 (Weighted: 4018.7173)  
 NLL Component: 17.9678  
 Min Variance: 1.31e-05  
 p1=0.251, p2=0.230  
 --- Iter [900/2000] ---  
 Total Loss: 2718.3442  
 MSE Component: 2.6998 (Weighted: 2699.7705)  
 NLL Component: 18.4861  
 Min Variance: 1.17e-05  
 p1=0.251, p2=0.230  
  
 --- Validation at iteration 900 ---  
 Average MSE: 255.1215, Average ANEES: 611.3295

---

--- Iter [901/2000] ---  
 Total Loss: 2961.1179  
 MSE Component: 2.9472 (Weighted: 2947.2008)  
 NLL Component: 13.8295

Min Variance: 1.62e-05  
p1=0.251, p2=0.230  
--- Iter [902/2000] ---  
Total Loss: 2543.7566  
MSE Component: 2.5258 (Weighted: 2525.8160)  
NLL Component: 17.8531  
Min Variance: 1.18e-05  
p1=0.251, p2=0.230  
--- Iter [903/2000] ---  
Total Loss: 1962.7551  
MSE Component: 1.9485 (Weighted: 1948.4688)  
NLL Component: 14.1986  
Min Variance: 5.23e-06  
p1=0.251, p2=0.230  
--- Iter [904/2000] ---  
Total Loss: 2513.3901  
MSE Component: 2.4981 (Weighted: 2498.0881)  
NLL Component: 15.2143  
Min Variance: 1.72e-05  
p1=0.251, p2=0.230  
--- Iter [905/2000] ---  
Total Loss: 2992.9202  
MSE Component: 2.9738 (Weighted: 2973.8271)  
NLL Component: 19.0054  
Min Variance: 1.24e-05  
p1=0.251, p2=0.230  
--- Iter [906/2000] ---  
Total Loss: 2427.6663  
MSE Component: 2.4100 (Weighted: 2409.9565)  
NLL Component: 17.6220  
Min Variance: 1.44e-05  
p1=0.251, p2=0.230  
--- Iter [907/2000] ---  
Total Loss: 4788.3687  
MSE Component: 4.7710 (Weighted: 4770.9885)  
NLL Component: 17.2925  
Min Variance: 1.60e-05  
p1=0.251, p2=0.230  
--- Iter [908/2000] ---  
Total Loss: 3210.9841  
MSE Component: 3.1955 (Weighted: 3195.4837)  
NLL Component: 15.4128  
Min Variance: 1.23e-05  
p1=0.251, p2=0.230  
--- Iter [909/2000] ---  
Total Loss: 4423.4780  
MSE Component: 4.4079 (Weighted: 4407.8841)  
NLL Component: 15.5059

```

Min Variance: 1.18e-05
p1=0.251, p2=0.230
--- Iter [910/2000] ---
Total Loss: 2132.4531
MSE Component: 2.1202 (Weighted: 2120.1537)
NLL Component: 12.2120
Min Variance: 3.29e-05
p1=0.251, p2=0.230

--- Validation at iteration 910 ---
Average MSE: 288.5899, Average ANEES: 521.8337
-----
--- Iter [911/2000] ---
Total Loss: 2540.8804
MSE Component: 2.5263 (Weighted: 2526.2592)
NLL Component: 14.5334
Min Variance: 4.92e-06
p1=0.251, p2=0.230
--- Iter [912/2000] ---
Total Loss: 2161.2625
MSE Component: 2.1469 (Weighted: 2146.9460)
NLL Component: 14.2288
Min Variance: 1.59e-05
p1=0.251, p2=0.230
--- Iter [913/2000] ---
Total Loss: 2613.1914
MSE Component: 2.5961 (Weighted: 2596.1323)
NLL Component: 16.9715
Min Variance: 1.27e-05
p1=0.251, p2=0.230
--- Iter [914/2000] ---
Total Loss: 1993.3024
MSE Component: 1.9803 (Weighted: 1980.3278)
NLL Component: 12.8867
Min Variance: 1.60e-05
p1=0.251, p2=0.230
--- Iter [915/2000] ---
Total Loss: 2440.1025
MSE Component: 2.4241 (Weighted: 2424.1295)
NLL Component: 15.8854
Min Variance: 1.14e-05
p1=0.251, p2=0.230
--- Iter [916/2000] ---
Total Loss: 3693.0193
MSE Component: 3.6811 (Weighted: 3681.0994)
NLL Component: 11.8322
Min Variance: 1.51e-05
p1=0.251, p2=0.230

```

```
--- Iter [917/2000] ---
Total Loss: 2546.2488
MSE Component: 2.5332 (Weighted: 2533.2041)
NLL Component: 12.9570
Min Variance: 1.45e-05
p1=0.251, p2=0.230
--- Iter [918/2000] ---
Total Loss: 3036.6382
MSE Component: 3.0113 (Weighted: 3011.3444)
NLL Component: 25.2060
Min Variance: 1.17e-05
p1=0.251, p2=0.230
--- Iter [919/2000] ---
Total Loss: 2161.4663
MSE Component: 2.1469 (Weighted: 2146.9202)
NLL Component: 14.4586
Min Variance: 4.88e-06
p1=0.251, p2=0.230
--- Iter [920/2000] ---
Total Loss: 2190.1387
MSE Component: 2.1776 (Weighted: 2177.5930)
NLL Component: 12.4580
Min Variance: 1.68e-05
p1=0.251, p2=0.230

--- Validation at iteration 920 ---
Average MSE: 241.3185, Average ANEES: 589.6091
-----
--- Iter [921/2000] ---
Total Loss: 2234.8496
MSE Component: 2.2153 (Weighted: 2215.3077)
NLL Component: 19.4544
Min Variance: 8.96e-06
p1=0.251, p2=0.230
--- Iter [922/2000] ---
Total Loss: 2472.2708
MSE Component: 2.4552 (Weighted: 2455.2302)
NLL Component: 16.9528
Min Variance: 1.14e-05
p1=0.251, p2=0.230
--- Iter [923/2000] ---
Total Loss: 3278.7849
MSE Component: 3.2617 (Weighted: 3261.7273)
NLL Component: 16.9701
Min Variance: 1.76e-05
p1=0.251, p2=0.230
--- Iter [924/2000] ---
Total Loss: 4735.5527
```

MSE Component: 4.7224 (Weighted: 4722.3768)  
NLL Component: 13.0880  
Min Variance: 1.00e-05  
p1=0.251, p2=0.230  
--- Iter [925/2000] ---  
Total Loss: 4234.4556  
MSE Component: 4.2189 (Weighted: 4218.8792)  
NLL Component: 15.4881  
Min Variance: 2.61e-05  
p1=0.251, p2=0.230  
--- Iter [926/2000] ---  
Total Loss: 2083.9028  
MSE Component: 2.0667 (Weighted: 2066.6609)  
NLL Component: 17.1543  
Min Variance: 5.76e-06  
p1=0.251, p2=0.230  
--- Iter [927/2000] ---  
Total Loss: 2762.4722  
MSE Component: 2.7458 (Weighted: 2745.8222)  
NLL Component: 16.5623  
Min Variance: 1.09e-05  
p1=0.251, p2=0.230  
--- Iter [928/2000] ---  
Total Loss: 1937.6721  
MSE Component: 1.9216 (Weighted: 1921.6352)  
NLL Component: 15.9492  
Min Variance: 1.36e-05  
p1=0.251, p2=0.230  
--- Iter [929/2000] ---  
Total Loss: 2271.1355  
MSE Component: 2.2600 (Weighted: 2260.0212)  
NLL Component: 11.0266  
Min Variance: 9.30e-06  
p1=0.251, p2=0.230  
--- Iter [930/2000] ---  
Total Loss: 1846.3770  
MSE Component: 1.8306 (Weighted: 1830.5944)  
NLL Component: 15.6948  
Min Variance: 9.50e-06  
p1=0.251, p2=0.230  
  
--- Validation at iteration 930 ---  
Average MSE: 246.5891, Average ANEES: 524.8589

---

--- Iter [931/2000] ---  
Total Loss: 1988.9612  
MSE Component: 1.9738 (Weighted: 1973.8177)  
NLL Component: 15.0557

Min Variance: 9.36e-06  
p1=0.251, p2=0.230  
--- Iter [932/2000] ---  
Total Loss: 2982.9805  
MSE Component: 2.9695 (Weighted: 2969.4874)  
NLL Component: 13.4052  
Min Variance: 5.58e-06  
p1=0.251, p2=0.230  
--- Iter [933/2000] ---  
Total Loss: 2841.5759  
MSE Component: 2.8235 (Weighted: 2823.4682)  
NLL Component: 18.0201  
Min Variance: 1.88e-05  
p1=0.251, p2=0.230  
--- Iter [934/2000] ---  
Total Loss: 2821.6541  
MSE Component: 2.8014 (Weighted: 2801.3620)  
NLL Component: 20.2044  
Min Variance: 1.19e-05  
p1=0.251, p2=0.230  
--- Iter [935/2000] ---  
Total Loss: 1992.7668  
MSE Component: 1.9777 (Weighted: 1977.7071)  
NLL Component: 14.9719  
Min Variance: 2.46e-06  
p1=0.251, p2=0.230  
--- Iter [936/2000] ---  
Total Loss: 1787.1149  
MSE Component: 1.7706 (Weighted: 1770.5982)  
NLL Component: 16.4289  
Min Variance: 2.09e-05  
p1=0.251, p2=0.230  
--- Iter [937/2000] ---  
Total Loss: 1901.6805  
MSE Component: 1.8876 (Weighted: 1887.6233)  
NLL Component: 13.9695  
Min Variance: 2.22e-05  
p1=0.251, p2=0.230  
--- Iter [938/2000] ---  
Total Loss: 2829.8220  
MSE Component: 2.8149 (Weighted: 2814.9447)  
NLL Component: 14.7895  
Min Variance: 8.32e-06  
p1=0.251, p2=0.230  
--- Iter [939/2000] ---  
Total Loss: 2840.2827  
MSE Component: 2.8225 (Weighted: 2822.5293)  
NLL Component: 17.6658

```

Min Variance: 1.30e-05
p1=0.251, p2=0.230
--- Iter [940/2000] ---
Total Loss: 2601.5603
MSE Component: 2.5906 (Weighted: 2590.6193)
NLL Component: 10.8534
Min Variance: 1.34e-05
p1=0.251, p2=0.230

--- Validation at iteration 940 ---
Average MSE: 259.7339, Average ANEES: 535.3651
-----
--- Iter [941/2000] ---
Total Loss: 2161.8799
MSE Component: 2.1477 (Weighted: 2147.6567)
NLL Component: 14.1355
Min Variance: 6.14e-06
p1=0.251, p2=0.230
--- Iter [942/2000] ---
Total Loss: 2091.1069
MSE Component: 2.0823 (Weighted: 2082.2511)
NLL Component: 8.7682
Min Variance: 1.86e-05
p1=0.251, p2=0.230
--- Iter [943/2000] ---
Total Loss: 2214.6360
MSE Component: 2.1992 (Weighted: 2199.1937)
NLL Component: 15.3547
Min Variance: 5.86e-06
p1=0.251, p2=0.230
--- Iter [944/2000] ---
Total Loss: 2259.9363
MSE Component: 2.2480 (Weighted: 2247.9782)
NLL Component: 11.8703
Min Variance: 2.80e-05
p1=0.251, p2=0.230
--- Iter [945/2000] ---
Total Loss: 1699.3459
MSE Component: 1.6841 (Weighted: 1684.0614)
NLL Component: 15.1968
Min Variance: 1.39e-05
p1=0.251, p2=0.230
--- Iter [946/2000] ---
Total Loss: 2846.5913
MSE Component: 2.8307 (Weighted: 2830.6527)
NLL Component: 15.8509
Min Variance: 8.72e-06
p1=0.251, p2=0.230

```

```
--- Iter [947/2000] ---
Total Loss: 2619.8074
MSE Component: 2.6064 (Weighted: 2606.4279)
NLL Component: 13.2916
Min Variance: 1.38e-05
p1=0.251, p2=0.230
--- Iter [948/2000] ---
Total Loss: 2808.6404
MSE Component: 2.7916 (Weighted: 2791.6274)
NLL Component: 16.9252
Min Variance: 2.12e-05
p1=0.251, p2=0.230
--- Iter [949/2000] ---
Total Loss: 3370.4487
MSE Component: 3.3511 (Weighted: 3351.1033)
NLL Component: 19.2578
Min Variance: 7.12e-06
p1=0.251, p2=0.230
--- Iter [950/2000] ---
Total Loss: 2136.5430
MSE Component: 2.1267 (Weighted: 2126.7021)
NLL Component: 9.7532
Min Variance: 1.08e-05
p1=0.251, p2=0.230

--- Validation at iteration 950 ---
Average MSE: 256.9391, Average ANEES: 504.6030
-----
--- Iter [951/2000] ---
Total Loss: 1714.3954
MSE Component: 1.7029 (Weighted: 1702.8946)
NLL Component: 11.4131
Min Variance: 1.86e-05
p1=0.251, p2=0.230
--- Iter [952/2000] ---
Total Loss: 1894.1893
MSE Component: 1.8795 (Weighted: 1879.4802)
NLL Component: 14.6214
Min Variance: 1.64e-05
p1=0.251, p2=0.230
--- Iter [953/2000] ---
Total Loss: 3339.8506
MSE Component: 3.3290 (Weighted: 3328.9628)
NLL Component: 10.8002
Min Variance: 8.94e-06
p1=0.251, p2=0.230
--- Iter [954/2000] ---
Total Loss: 2853.2087
```

MSE Component: 2.8337 (Weighted: 2833.7314)  
NLL Component: 19.3896  
Min Variance: 1.33e-05  
p1=0.251, p2=0.230  
--- Iter [955/2000] ---  
Total Loss: 2658.6584  
MSE Component: 2.6497 (Weighted: 2649.7288)  
NLL Component: 8.8421  
Min Variance: 8.18e-06  
p1=0.251, p2=0.230  
--- Iter [956/2000] ---  
Total Loss: 2595.6401  
MSE Component: 2.5807 (Weighted: 2580.6832)  
NLL Component: 14.8691  
Min Variance: 1.95e-05  
p1=0.251, p2=0.230  
--- Iter [957/2000] ---  
Total Loss: 2448.2136  
MSE Component: 2.4351 (Weighted: 2435.0920)  
NLL Component: 13.0340  
Min Variance: 1.17e-05  
p1=0.251, p2=0.230  
--- Iter [958/2000] ---  
Total Loss: 1720.5116  
MSE Component: 1.7071 (Weighted: 1707.1075)  
NLL Component: 13.3162  
Min Variance: 1.13e-05  
p1=0.251, p2=0.230  
--- Iter [959/2000] ---  
Total Loss: 1640.9423  
MSE Component: 1.6255 (Weighted: 1625.4789)  
NLL Component: 15.3756  
Min Variance: 1.53e-05  
p1=0.251, p2=0.230  
--- Iter [960/2000] ---  
Total Loss: 3335.0940  
MSE Component: 3.3060 (Weighted: 3305.9688)  
NLL Component: 29.0376  
Min Variance: 1.56e-05  
p1=0.251, p2=0.230  
  
--- Validation at iteration 960 ---  
Average MSE: 260.2811, Average ANEES: 461.6568

---

--- Iter [961/2000] ---  
Total Loss: 2123.0676  
MSE Component: 2.1075 (Weighted: 2107.4834)  
NLL Component: 15.4965

Min Variance: 2.25e-05  
p1=0.251, p2=0.230  
--- Iter [962/2000] ---  
Total Loss: 3442.2043  
MSE Component: 3.4238 (Weighted: 3423.7745)  
NLL Component: 18.3423  
Min Variance: 1.98e-05  
p1=0.251, p2=0.230  
--- Iter [963/2000] ---  
Total Loss: 2655.7422  
MSE Component: 2.6433 (Weighted: 2643.3039)  
NLL Component: 12.3505  
Min Variance: 1.13e-05  
p1=0.251, p2=0.230  
--- Iter [964/2000] ---  
Total Loss: 2260.8494  
MSE Component: 2.2470 (Weighted: 2246.9552)  
NLL Component: 13.8066  
Min Variance: 2.85e-05  
p1=0.251, p2=0.230  
--- Iter [965/2000] ---  
Total Loss: 1732.2419  
MSE Component: 1.7161 (Weighted: 1716.0828)  
NLL Component: 16.0714  
Min Variance: 6.76e-06  
p1=0.251, p2=0.230  
--- Iter [966/2000] ---  
Total Loss: 1906.2961  
MSE Component: 1.8884 (Weighted: 1888.3818)  
NLL Component: 17.8265  
Min Variance: 2.58e-06  
p1=0.251, p2=0.230  
--- Iter [967/2000] ---  
Total Loss: 2303.6055  
MSE Component: 2.2878 (Weighted: 2287.8294)  
NLL Component: 15.6884  
Min Variance: 3.81e-06  
p1=0.251, p2=0.230  
--- Iter [968/2000] ---  
Total Loss: 2513.8108  
MSE Component: 2.5056 (Weighted: 2505.5912)  
NLL Component: 8.1320  
Min Variance: 1.23e-05  
p1=0.251, p2=0.229  
--- Iter [969/2000] ---  
Total Loss: 2370.2976  
MSE Component: 2.3519 (Weighted: 2351.8684)  
NLL Component: 18.3415

```

Min Variance: 1.43e-05
p1=0.251, p2=0.229
--- Iter [970/2000] ---
Total Loss: 1697.0594
MSE Component: 1.6846 (Weighted: 1684.5775)
NLL Component: 12.3941
Min Variance: 1.94e-05
p1=0.251, p2=0.229

--- Validation at iteration 970 ---
Average MSE: 239.3381, Average ANEES: 535.3149
-----
--- Iter [971/2000] ---
Total Loss: 2071.6118
MSE Component: 2.0569 (Weighted: 2056.8638)
NLL Component: 14.6604
Min Variance: 1.60e-05
p1=0.251, p2=0.229
--- Iter [972/2000] ---
Total Loss: 2434.1921
MSE Component: 2.4214 (Weighted: 2421.3841)
NLL Component: 12.7206
Min Variance: 1.79e-05
p1=0.251, p2=0.229
--- Iter [973/2000] ---
Total Loss: 1686.7249
MSE Component: 1.6717 (Weighted: 1671.7404)
NLL Component: 14.8968
Min Variance: 1.81e-05
p1=0.251, p2=0.229
--- Iter [974/2000] ---
Total Loss: 2094.5190
MSE Component: 2.0774 (Weighted: 2077.3816)
NLL Component: 17.0497
Min Variance: 6.83e-06
p1=0.251, p2=0.229
--- Iter [975/2000] ---
Total Loss: 2241.8579
MSE Component: 2.2244 (Weighted: 2224.3764)
NLL Component: 17.3938
Min Variance: 2.37e-05
p1=0.251, p2=0.229
--- Iter [976/2000] ---
Total Loss: 3140.4229
MSE Component: 3.1281 (Weighted: 3128.1121)
NLL Component: 12.2232
Min Variance: 1.23e-05
p1=0.251, p2=0.229

```

```
--- Iter [977/2000] ---
Total Loss: 3241.0334
MSE Component: 3.2287 (Weighted: 3228.6625)
NLL Component: 12.2833
Min Variance: 1.38e-05
p1=0.251, p2=0.229
--- Iter [978/2000] ---
Total Loss: 3036.0496
MSE Component: 3.0182 (Weighted: 3018.1844)
NLL Component: 17.7775
Min Variance: 1.56e-05
p1=0.251, p2=0.229
--- Iter [979/2000] ---
Total Loss: 1881.2748
MSE Component: 1.8708 (Weighted: 1870.7781)
NLL Component: 10.4090
Min Variance: 1.40e-05
p1=0.251, p2=0.229
--- Iter [980/2000] ---
Total Loss: 1960.4111
MSE Component: 1.9471 (Weighted: 1947.0950)
NLL Component: 13.2283
Min Variance: 1.48e-05
p1=0.251, p2=0.229

--- Validation at iteration 980 ---
Average MSE: 249.0749, Average ANEES: 661.5446
-----
--- Iter [981/2000] ---
Total Loss: 1882.5131
MSE Component: 1.8641 (Weighted: 1864.0949)
NLL Component: 18.3304
Min Variance: 1.99e-05
p1=0.251, p2=0.229
--- Iter [982/2000] ---
Total Loss: 3037.0291
MSE Component: 3.0225 (Weighted: 3022.4621)
NLL Component: 14.4793
Min Variance: 9.19e-06
p1=0.251, p2=0.229
--- Iter [983/2000] ---
Total Loss: 2023.4280
MSE Component: 2.0099 (Weighted: 2009.9235)
NLL Component: 13.4168
Min Variance: 1.40e-05
p1=0.251, p2=0.229
--- Iter [984/2000] ---
Total Loss: 3149.4062
```

MSE Component: 3.1391 (Weighted: 3139.1017)  
NLL Component: 10.2169  
Min Variance: 1.66e-05  
p1=0.251, p2=0.229  
--- Iter [985/2000] ---  
Total Loss: 2533.6445  
MSE Component: 2.5205 (Weighted: 2520.5188)  
NLL Component: 13.0382  
Min Variance: 6.52e-06  
p1=0.251, p2=0.229  
--- Iter [986/2000] ---  
Total Loss: 2184.6045  
MSE Component: 2.1723 (Weighted: 2172.3342)  
NLL Component: 12.1827  
Min Variance: 2.02e-05  
p1=0.251, p2=0.229  
--- Iter [987/2000] ---  
Total Loss: 2164.9429  
MSE Component: 2.1511 (Weighted: 2151.1221)  
NLL Component: 13.7332  
Min Variance: 1.70e-05  
p1=0.251, p2=0.229  
--- Iter [988/2000] ---  
Total Loss: 1835.7219  
MSE Component: 1.8246 (Weighted: 1824.5690)  
NLL Component: 11.0652  
Min Variance: 5.19e-06  
p1=0.251, p2=0.229  
--- Iter [989/2000] ---  
Total Loss: 2383.2427  
MSE Component: 2.3645 (Weighted: 2364.5492)  
NLL Component: 18.6059  
Min Variance: 1.31e-05  
p1=0.251, p2=0.229  
--- Iter [990/2000] ---  
Total Loss: 3771.7371  
MSE Component: 3.7514 (Weighted: 3751.3754)  
NLL Component: 20.2739  
Min Variance: 1.05e-05  
p1=0.251, p2=0.229  
  
--- Validation at iteration 990 ---  
Average MSE: 237.1599, Average ANEES: 557.6729

---

--- Iter [991/2000] ---  
Total Loss: 3686.7134  
MSE Component: 3.6711 (Weighted: 3671.1071)  
NLL Component: 15.5189

Min Variance: 1.32e-05  
p1=0.251, p2=0.229  
--- Iter [992/2000] ---  
Total Loss: 2961.7400  
MSE Component: 2.9471 (Weighted: 2947.0563)  
NLL Component: 14.5960  
Min Variance: 1.27e-05  
p1=0.250, p2=0.229  
--- Iter [993/2000] ---  
Total Loss: 2434.1079  
MSE Component: 2.4208 (Weighted: 2420.8071)  
NLL Component: 13.2131  
Min Variance: 6.43e-06  
p1=0.250, p2=0.229  
--- Iter [994/2000] ---  
Total Loss: 2434.7192  
MSE Component: 2.4221 (Weighted: 2422.1044)  
NLL Component: 12.5274  
Min Variance: 1.30e-05  
p1=0.250, p2=0.229  
--- Iter [995/2000] ---  
Total Loss: 2248.6653  
MSE Component: 2.2290 (Weighted: 2228.9705)  
NLL Component: 19.6073  
Min Variance: 9.57e-06  
p1=0.250, p2=0.229  
--- Iter [996/2000] ---  
Total Loss: 2059.2524  
MSE Component: 2.0417 (Weighted: 2041.6648)  
NLL Component: 17.4999  
Min Variance: 6.41e-06  
p1=0.250, p2=0.229  
--- Iter [997/2000] ---  
Total Loss: 2421.5166  
MSE Component: 2.4066 (Weighted: 2406.6055)  
NLL Component: 14.8235  
Min Variance: 1.26e-05  
p1=0.250, p2=0.229  
--- Iter [998/2000] ---  
Total Loss: 2415.3989  
MSE Component: 2.4000 (Weighted: 2399.9505)  
NLL Component: 15.3608  
Min Variance: 9.84e-06  
p1=0.250, p2=0.229  
--- Iter [999/2000] ---  
Total Loss: 5149.8672  
MSE Component: 5.1390 (Weighted: 5138.9618)  
NLL Component: 10.8176

```

Min Variance: 1.43e-05
p1=0.250, p2=0.229
--- Iter [1000/2000] ---
Total Loss: 2502.3157
MSE Component: 2.4862 (Weighted: 2486.1903)
NLL Component: 16.0377
Min Variance: 1.25e-05
p1=0.250, p2=0.229

--- Validation at iteration 1000 ---
Average MSE: 252.5762, Average ANEES: 460.5830
-----
--- Iter [1001/2000] ---
Total Loss: 4207.5303
MSE Component: 4.1971 (Weighted: 4197.1340)
NLL Component: 10.3088
Min Variance: 1.20e-05
p1=0.250, p2=0.229
--- Iter [1002/2000] ---
Total Loss: 3873.4446
MSE Component: 3.8621 (Weighted: 3862.0634)
NLL Component: 11.2935
Min Variance: 1.69e-05
p1=0.250, p2=0.229
--- Iter [1003/2000] ---
Total Loss: 3025.3357
MSE Component: 3.0100 (Weighted: 3009.9730)
NLL Component: 15.2750
Min Variance: 2.05e-05
p1=0.250, p2=0.229
--- Iter [1004/2000] ---
Total Loss: 2633.7312
MSE Component: 2.6181 (Weighted: 2618.1452)
NLL Component: 15.4982
Min Variance: 1.28e-05
p1=0.250, p2=0.229
--- Iter [1005/2000] ---
Total Loss: 1812.5142
MSE Component: 1.7998 (Weighted: 1799.7774)
NLL Component: 12.6490
Min Variance: 1.03e-05
p1=0.250, p2=0.229
--- Iter [1006/2000] ---
Total Loss: 2271.7417
MSE Component: 2.2579 (Weighted: 2257.8743)
NLL Component: 13.7797
Min Variance: 1.21e-05
p1=0.250, p2=0.229

```

```
--- Iter [1007/2000] ---
Total Loss: 2827.2036
MSE Component: 2.8126 (Weighted: 2812.5548)
NLL Component: 14.5611
Min Variance: 1.61e-05
p1=0.250, p2=0.229
--- Iter [1008/2000] ---
Total Loss: 2269.7825
MSE Component: 2.2604 (Weighted: 2260.3765)
NLL Component: 9.3184
Min Variance: 6.26e-06
p1=0.250, p2=0.229
--- Iter [1009/2000] ---
Total Loss: 2473.6365
MSE Component: 2.4631 (Weighted: 2463.0611)
NLL Component: 10.4878
Min Variance: 1.55e-05
p1=0.250, p2=0.229
--- Iter [1010/2000] ---
Total Loss: 2901.7048
MSE Component: 2.8868 (Weighted: 2886.7543)
NLL Component: 14.8628
Min Variance: 9.41e-06
p1=0.250, p2=0.229

--- Validation at iteration 1010 ---
Average MSE: 229.1591, Average ANEES: 527.1625
-----
--- Iter [1011/2000] ---
Total Loss: 3866.3064
MSE Component: 3.8512 (Weighted: 3851.2180)
NLL Component: 15.0007
Min Variance: 1.15e-05
p1=0.250, p2=0.229
--- Iter [1012/2000] ---
Total Loss: 3571.6082
MSE Component: 3.5593 (Weighted: 3559.3150)
NLL Component: 12.2055
Min Variance: 1.11e-05
p1=0.250, p2=0.229
--- Iter [1013/2000] ---
Total Loss: 2198.6411
MSE Component: 2.1800 (Weighted: 2179.9932)
NLL Component: 18.5604
Min Variance: 1.01e-05
p1=0.250, p2=0.229
--- Iter [1014/2000] ---
Total Loss: 2618.7673
```

MSE Component: 2.5999 (Weighted: 2599.9436)  
NLL Component: 18.7362  
Min Variance: 6.63e-06  
p1=0.250, p2=0.229  
--- Iter [1015/2000] ---  
Total Loss: 1931.3263  
MSE Component: 1.9178 (Weighted: 1917.7974)  
NLL Component: 13.4411  
Min Variance: 1.30e-05  
p1=0.250, p2=0.229  
--- Iter [1016/2000] ---  
Total Loss: 2477.3411  
MSE Component: 2.4643 (Weighted: 2464.2563)  
NLL Component: 12.9970  
Min Variance: 1.02e-05  
p1=0.250, p2=0.229  
--- Iter [1017/2000] ---  
Total Loss: 2708.6409  
MSE Component: 2.6972 (Weighted: 2697.1641)  
NLL Component: 11.3893  
Min Variance: 1.54e-05  
p1=0.250, p2=0.229  
--- Iter [1018/2000] ---  
Total Loss: 3154.4897  
MSE Component: 3.1416 (Weighted: 3141.5665)  
NLL Component: 12.8357  
Min Variance: 7.23e-06  
p1=0.250, p2=0.229  
--- Iter [1019/2000] ---  
Total Loss: 1854.5574  
MSE Component: 1.8460 (Weighted: 1845.9879)  
NLL Component: 8.4819  
Min Variance: 1.90e-05  
p1=0.250, p2=0.229  
--- Iter [1020/2000] ---  
Total Loss: 1861.3445  
MSE Component: 1.8401 (Weighted: 1840.1316)  
NLL Component: 21.1253  
Min Variance: 8.74e-06  
p1=0.250, p2=0.229  
  
--- Validation at iteration 1020 ---  
Average MSE: 242.4492, Average ANEES: 471.9071

---

--- Iter [1021/2000] ---  
Total Loss: 2294.2158  
MSE Component: 2.2782 (Weighted: 2278.1835)  
NLL Component: 15.9448

Min Variance: 1.48e-05  
p1=0.250, p2=0.229  
--- Iter [1022/2000] ---  
Total Loss: 2073.2927  
MSE Component: 2.0596 (Weighted: 2059.6359)  
NLL Component: 13.5691  
Min Variance: 6.50e-06  
p1=0.250, p2=0.229  
--- Iter [1023/2000] ---  
Total Loss: 2638.5854  
MSE Component: 2.6227 (Weighted: 2622.7067)  
NLL Component: 15.7913  
Min Variance: 1.24e-05  
p1=0.250, p2=0.229  
--- Iter [1024/2000] ---  
Total Loss: 4216.7227  
MSE Component: 4.2033 (Weighted: 4203.3167)  
NLL Component: 13.3180  
Min Variance: 7.68e-06  
p1=0.250, p2=0.229  
--- Iter [1025/2000] ---  
Total Loss: 4169.9507  
MSE Component: 4.1555 (Weighted: 4155.4751)  
NLL Component: 14.3879  
Min Variance: 1.40e-05  
p1=0.250, p2=0.229  
--- Iter [1026/2000] ---  
Total Loss: 2495.4036  
MSE Component: 2.4847 (Weighted: 2484.6511)  
NLL Component: 10.6649  
Min Variance: 1.68e-05  
p1=0.250, p2=0.229  
--- Iter [1027/2000] ---  
Total Loss: 3814.7178  
MSE Component: 3.7958 (Weighted: 3795.8329)  
NLL Component: 18.7974  
Min Variance: 1.35e-05  
p1=0.250, p2=0.229  
--- Iter [1028/2000] ---  
Total Loss: 5522.8604  
MSE Component: 5.5071 (Weighted: 5507.0810)  
NLL Component: 15.6913  
Min Variance: 1.91e-05  
p1=0.250, p2=0.229  
--- Iter [1029/2000] ---  
Total Loss: 4478.6445  
MSE Component: 4.4657 (Weighted: 4465.6906)  
NLL Component: 12.8660

```

Min Variance: 8.37e-06
p1=0.250, p2=0.229
--- Iter [1030/2000] ---
Total Loss: 2751.5740
MSE Component: 2.7378 (Weighted: 2737.7667)
NLL Component: 13.7195
Min Variance: 1.63e-05
p1=0.250, p2=0.229

--- Validation at iteration 1030 ---
Average MSE: 238.8722, Average ANEES: 624.6091
-----
--- Iter [1031/2000] ---
Total Loss: 3391.9500
MSE Component: 3.3795 (Weighted: 3379.5402)
NLL Component: 12.3220
Min Variance: 1.20e-05
p1=0.250, p2=0.229
--- Iter [1032/2000] ---
Total Loss: 1598.2830
MSE Component: 1.5822 (Weighted: 1582.1996)
NLL Component: 15.9958
Min Variance: 9.30e-06
p1=0.250, p2=0.229
--- Iter [1033/2000] ---
Total Loss: 4320.9004
MSE Component: 4.3106 (Weighted: 4310.6198)
NLL Component: 10.1928
Min Variance: 1.75e-05
p1=0.250, p2=0.229
--- Iter [1034/2000] ---
Total Loss: 4651.2368
MSE Component: 4.6373 (Weighted: 4637.3181)
NLL Component: 13.8306
Min Variance: 5.58e-06
p1=0.250, p2=0.229
--- Iter [1035/2000] ---
Total Loss: 7296.4585
MSE Component: 7.2810 (Weighted: 7281.0130)
NLL Component: 15.3575
Min Variance: 1.03e-05
p1=0.250, p2=0.229
--- Iter [1036/2000] ---
Total Loss: 4098.1919
MSE Component: 4.0823 (Weighted: 4082.2873)
NLL Component: 15.8167
Min Variance: 8.22e-06
p1=0.250, p2=0.229

```

```
--- Iter [1037/2000] ---
Total Loss: 4021.4458
MSE Component: 4.0089 (Weighted: 4008.8921)
NLL Component: 12.4660
Min Variance: 5.13e-06
p1=0.250, p2=0.229
--- Iter [1038/2000] ---
Total Loss: 6274.5645
MSE Component: 6.2602 (Weighted: 6260.1647)
NLL Component: 14.3119
Min Variance: 1.94e-05
p1=0.250, p2=0.229
--- Iter [1039/2000] ---
Total Loss: 4354.3027
MSE Component: 4.3439 (Weighted: 4343.9279)
NLL Component: 10.2869
Min Variance: 2.46e-05
p1=0.250, p2=0.229
--- Iter [1040/2000] ---
Total Loss: 4106.2725
MSE Component: 4.0914 (Weighted: 4091.4221)
NLL Component: 14.7623
Min Variance: 7.03e-06
p1=0.250, p2=0.229

--- Validation at iteration 1040 ---
Average MSE: 230.6342, Average ANEES: 567.6390
-----
--- Iter [1041/2000] ---
Total Loss: 3207.5149
MSE Component: 3.1872 (Weighted: 3187.1841)
NLL Component: 20.2433
Min Variance: 1.67e-05
p1=0.250, p2=0.229
--- Iter [1042/2000] ---
Total Loss: 3235.3284
MSE Component: 3.2237 (Weighted: 3223.7103)
NLL Component: 11.5306
Min Variance: 1.60e-05
p1=0.250, p2=0.229
--- Iter [1043/2000] ---
Total Loss: 2875.8984
MSE Component: 2.8615 (Weighted: 2861.4964)
NLL Component: 14.3145
Min Variance: 1.90e-05
p1=0.250, p2=0.229
--- Iter [1044/2000] ---
Total Loss: 4237.3042
```

MSE Component: 4.2214 (Weighted: 4221.4165)  
NLL Component: 15.7996  
Min Variance: 2.10e-05  
p1=0.250, p2=0.229  
--- Iter [1045/2000] ---  
Total Loss: 4755.3213  
MSE Component: 4.7370 (Weighted: 4737.0186)  
NLL Component: 18.2149  
Min Variance: 1.70e-05  
p1=0.250, p2=0.229  
--- Iter [1046/2000] ---  
Total Loss: 6692.8247  
MSE Component: 6.6785 (Weighted: 6678.4978)  
NLL Component: 14.2392  
Min Variance: 1.41e-05  
p1=0.250, p2=0.229  
--- Iter [1047/2000] ---  
Total Loss: 7429.3096  
MSE Component: 7.4150 (Weighted: 7415.0209)  
NLL Component: 14.2008  
Min Variance: 1.24e-05  
p1=0.250, p2=0.229  
--- Iter [1048/2000] ---  
Total Loss: 7780.3896  
MSE Component: 7.7635 (Weighted: 7763.4602)  
NLL Component: 16.8417  
Min Variance: 1.32e-05  
p1=0.250, p2=0.229  
--- Iter [1049/2000] ---  
Total Loss: 3928.7046  
MSE Component: 3.9149 (Weighted: 3914.9365)  
NLL Component: 13.6803  
Min Variance: 1.39e-05  
p1=0.250, p2=0.229  
--- Iter [1050/2000] ---  
Total Loss: 3641.5420  
MSE Component: 3.6160 (Weighted: 3615.9770)  
NLL Component: 25.4772  
Min Variance: 8.18e-06  
p1=0.250, p2=0.229  
  
--- Validation at iteration 1050 ---  
Average MSE: 255.8163, Average ANEES: 539.5137

---

--- Iter [1051/2000] ---  
Total Loss: 4006.1914  
MSE Component: 3.9871 (Weighted: 3987.1016)  
NLL Component: 19.0021

Min Variance: 9.72e-06  
p1=0.250, p2=0.229  
--- Iter [1052/2000] ---  
Total Loss: 3697.7639  
MSE Component: 3.6851 (Weighted: 3685.0903)  
NLL Component: 12.5860  
Min Variance: 1.02e-05  
p1=0.250, p2=0.229  
--- Iter [1053/2000] ---  
Total Loss: 3763.7954  
MSE Component: 3.7500 (Weighted: 3749.9752)  
NLL Component: 13.7328  
Min Variance: 1.22e-05  
p1=0.250, p2=0.229  
--- Iter [1054/2000] ---  
Total Loss: 3171.4087  
MSE Component: 3.1599 (Weighted: 3159.9221)  
NLL Component: 11.3989  
Min Variance: 1.05e-05  
p1=0.250, p2=0.229  
--- Iter [1055/2000] ---  
Total Loss: 3693.5786  
MSE Component: 3.6817 (Weighted: 3681.6630)  
NLL Component: 11.8279  
Min Variance: 1.03e-05  
p1=0.250, p2=0.229  
--- Iter [1056/2000] ---  
Total Loss: 5935.4526  
MSE Component: 5.9237 (Weighted: 5923.6975)  
NLL Component: 11.6676  
Min Variance: 8.07e-06  
p1=0.250, p2=0.229  
--- Iter [1057/2000] ---  
Total Loss: 3979.2473  
MSE Component: 3.9693 (Weighted: 3969.3277)  
NLL Component: 9.8320  
Min Variance: 1.58e-05  
p1=0.250, p2=0.229  
--- Iter [1058/2000] ---  
Total Loss: 5978.6221  
MSE Component: 5.9643 (Weighted: 5964.3335)  
NLL Component: 14.2005  
Min Variance: 1.24e-05  
p1=0.250, p2=0.229  
--- Iter [1059/2000] ---  
Total Loss: 3973.4199  
MSE Component: 3.9620 (Weighted: 3961.9594)  
NLL Component: 11.3727

```
Min Variance: 7.17e-06
p1=0.250, p2=0.229
--- Iter [1060/2000] ---
Total Loss: 3771.6914
MSE Component: 3.7602 (Weighted: 3760.1781)
NLL Component: 11.4257
Min Variance: 2.25e-05
p1=0.250, p2=0.229

--- Validation at iteration 1060 ---
Average MSE: 277.7622, Average ANEES: 536.5517
-----
--- Iter [1061/2000] ---
Total Loss: 4943.7124
MSE Component: 4.9304 (Weighted: 4930.4228)
NLL Component: 13.2018
Min Variance: 2.83e-05
p1=0.250, p2=0.229
--- Iter [1062/2000] ---
Total Loss: 1643.6476
MSE Component: 1.6322 (Weighted: 1632.1781)
NLL Component: 11.3819
Min Variance: 2.20e-05
p1=0.250, p2=0.229
--- Iter [1063/2000] ---
Total Loss: 2246.1689
MSE Component: 2.2311 (Weighted: 2231.0524)
NLL Component: 15.0288
Min Variance: 1.25e-05
p1=0.250, p2=0.229
--- Iter [1064/2000] ---
Total Loss: 2341.0803
MSE Component: 2.3253 (Weighted: 2325.2842)
NLL Component: 15.7086
Min Variance: 1.76e-05
p1=0.250, p2=0.229
--- Iter [1065/2000] ---
Total Loss: 2854.1709
MSE Component: 2.8401 (Weighted: 2840.0822)
NLL Component: 14.0011
Min Variance: 1.62e-05
p1=0.250, p2=0.229
--- Iter [1066/2000] ---
Total Loss: 3457.8296
MSE Component: 3.4446 (Weighted: 3444.6423)
NLL Component: 13.0997
Min Variance: 1.49e-05
p1=0.250, p2=0.229
```

```
--- Iter [1067/2000] ---
Total Loss: 4610.1396
MSE Component: 4.5956 (Weighted: 4595.5591)
NLL Component: 14.4927
Min Variance: 1.68e-05
p1=0.250, p2=0.229
--- Iter [1068/2000] ---
Total Loss: 2372.7168
MSE Component: 2.3526 (Weighted: 2352.6185)
NLL Component: 20.0108
Min Variance: 9.32e-06
p1=0.250, p2=0.229
--- Iter [1069/2000] ---
Total Loss: 4460.5420
MSE Component: 4.4458 (Weighted: 4445.7698)
NLL Component: 14.6840
Min Variance: 9.02e-06
p1=0.250, p2=0.229
--- Iter [1070/2000] ---
Total Loss: 2875.9312
MSE Component: 2.8590 (Weighted: 2859.0398)
NLL Component: 16.8038
Min Variance: 3.28e-06
p1=0.250, p2=0.229

--- Validation at iteration 1070 ---
Average MSE: 231.7465, Average ANEES: 459.1877
-----
--- Iter [1071/2000] ---
Total Loss: 4162.8687
MSE Component: 4.1477 (Weighted: 4147.7447)
NLL Component: 15.0360
Min Variance: 1.25e-05
p1=0.250, p2=0.229
--- Iter [1072/2000] ---
Total Loss: 2365.8574
MSE Component: 2.3523 (Weighted: 2352.3195)
NLL Component: 13.4502
Min Variance: 1.19e-05
p1=0.250, p2=0.229
--- Iter [1073/2000] ---
Total Loss: 2347.8142
MSE Component: 2.3360 (Weighted: 2335.9756)
NLL Component: 11.7511
Min Variance: 2.56e-05
p1=0.250, p2=0.229
--- Iter [1074/2000] ---
Total Loss: 1802.3201
```

MSE Component: 1.7868 (Weighted: 1786.8146)  
NLL Component: 15.4178  
Min Variance: 1.24e-05  
p1=0.250, p2=0.229  
--- Iter [1075/2000] ---  
Total Loss: 2749.6853  
MSE Component: 2.7326 (Weighted: 2732.5819)  
NLL Component: 17.0160  
Min Variance: 1.14e-05  
p1=0.250, p2=0.229  
--- Iter [1076/2000] ---  
Total Loss: 3699.9766  
MSE Component: 3.6903 (Weighted: 3690.2652)  
NLL Component: 9.6238  
Min Variance: 1.74e-05  
p1=0.250, p2=0.229  
--- Iter [1077/2000] ---  
Total Loss: 2621.2271  
MSE Component: 2.6073 (Weighted: 2607.3415)  
NLL Component: 13.7979  
Min Variance: 1.25e-05  
p1=0.250, p2=0.229  
--- Iter [1078/2000] ---  
Total Loss: 4451.5435  
MSE Component: 4.4376 (Weighted: 4437.5572)  
NLL Component: 13.8985  
Min Variance: 7.84e-06  
p1=0.250, p2=0.229  
--- Iter [1079/2000] ---  
Total Loss: 2373.5090  
MSE Component: 2.3620 (Weighted: 2361.9854)  
NLL Component: 11.4360  
Min Variance: 1.50e-05  
p1=0.250, p2=0.229  
--- Iter [1080/2000] ---  
Total Loss: 2799.6287  
MSE Component: 2.7834 (Weighted: 2783.3962)  
NLL Component: 16.1448  
Min Variance: 9.96e-06  
p1=0.250, p2=0.229  
  
--- Validation at iteration 1080 ---  
Average MSE: 258.6591, Average ANEES: 485.8675

---

--- Iter [1081/2000] ---  
Total Loss: 2717.7537  
MSE Component: 2.7042 (Weighted: 2704.2024)  
NLL Component: 13.4637

Min Variance: 1.82e-05  
p1=0.250, p2=0.229  
--- Iter [1082/2000] ---  
Total Loss: 2612.1355  
MSE Component: 2.6030 (Weighted: 2602.9761)  
NLL Component: 9.0717  
Min Variance: 3.07e-05  
p1=0.249, p2=0.229  
--- Iter [1083/2000] ---  
Total Loss: 2301.0063  
MSE Component: 2.2870 (Weighted: 2286.9589)  
NLL Component: 13.9598  
Min Variance: 6.45e-06  
p1=0.249, p2=0.229  
--- Iter [1084/2000] ---  
Total Loss: 2638.9575  
MSE Component: 2.6256 (Weighted: 2625.5701)  
NLL Component: 13.2999  
Min Variance: 2.66e-05  
p1=0.249, p2=0.229  
--- Iter [1085/2000] ---  
Total Loss: 3692.2437  
MSE Component: 3.6688 (Weighted: 3668.7908)  
NLL Component: 23.3652  
Min Variance: 1.98e-05  
p1=0.249, p2=0.229  
--- Iter [1086/2000] ---  
Total Loss: 2947.2092  
MSE Component: 2.9343 (Weighted: 2934.2587)  
NLL Component: 12.8629  
Min Variance: 1.27e-05  
p1=0.249, p2=0.229  
--- Iter [1087/2000] ---  
Total Loss: 3586.0269  
MSE Component: 3.5730 (Weighted: 3573.0488)  
NLL Component: 12.8903  
Min Variance: 2.14e-05  
p1=0.249, p2=0.229  
--- Iter [1088/2000] ---  
Total Loss: 3142.7822  
MSE Component: 3.1238 (Weighted: 3123.8017)  
NLL Component: 18.8929  
Min Variance: 8.53e-06  
p1=0.249, p2=0.229  
--- Iter [1089/2000] ---  
Total Loss: 2715.6658  
MSE Component: 2.6994 (Weighted: 2699.3530)  
NLL Component: 16.2252

```
Min Variance: 5.75e-06
p1=0.249, p2=0.229
--- Iter [1090/2000] ---
Total Loss: 2686.0046
MSE Component: 2.6695 (Weighted: 2669.5352)
NLL Component: 16.3819
Min Variance: 9.34e-06
p1=0.249, p2=0.229

--- Validation at iteration 1090 ---
Average MSE: 235.4142, Average ANEES: 574.6417
-----
--- Iter [1091/2000] ---
Total Loss: 2337.4065
MSE Component: 2.3202 (Weighted: 2320.2209)
NLL Component: 17.0979
Min Variance: 1.41e-05
p1=0.249, p2=0.229
--- Iter [1092/2000] ---
Total Loss: 2179.6980
MSE Component: 2.1689 (Weighted: 2168.9377)
NLL Component: 10.6727
Min Variance: 1.18e-05
p1=0.249, p2=0.229
--- Iter [1093/2000] ---
Total Loss: 1967.9883
MSE Component: 1.9568 (Weighted: 1956.8113)
NLL Component: 11.0894
Min Variance: 1.22e-05
p1=0.249, p2=0.229
--- Iter [1094/2000] ---
Total Loss: 2359.4526
MSE Component: 2.3467 (Weighted: 2346.7216)
NLL Component: 12.6433
Min Variance: 1.35e-05
p1=0.249, p2=0.229
--- Iter [1095/2000] ---
Total Loss: 2644.9011
MSE Component: 2.6349 (Weighted: 2634.8977)
NLL Component: 9.9157
Min Variance: 1.83e-05
p1=0.249, p2=0.229
--- Iter [1096/2000] ---
Total Loss: 3241.5798
MSE Component: 3.2284 (Weighted: 3228.4148)
NLL Component: 13.0774
Min Variance: 2.02e-05
p1=0.249, p2=0.229
```

```
--- Iter [1097/2000] ---
Total Loss: 4092.0015
MSE Component: 4.0822 (Weighted: 4082.1733)
NLL Component: 9.7405
Min Variance: 2.72e-05
p1=0.249, p2=0.229
--- Iter [1098/2000] ---
Total Loss: 1969.6245
MSE Component: 1.9489 (Weighted: 1948.8803)
NLL Component: 20.6566
Min Variance: 9.17e-06
p1=0.249, p2=0.229
--- Iter [1099/2000] ---
Total Loss: 2138.8865
MSE Component: 2.1264 (Weighted: 2126.3859)
NLL Component: 12.4128
Min Variance: 5.37e-06
p1=0.249, p2=0.229
--- Iter [1100/2000] ---
Total Loss: 1955.5383
MSE Component: 1.9372 (Weighted: 1937.1792)
NLL Component: 18.2714
Min Variance: 2.55e-05
p1=0.249, p2=0.229

--- Validation at iteration 1100 ---
Average MSE: 236.3828, Average ANEES: 538.4022
-----
--- Iter [1101/2000] ---
Total Loss: 2144.1155
MSE Component: 2.1348 (Weighted: 2134.7945)
NLL Component: 9.2334
Min Variance: 3.04e-05
p1=0.249, p2=0.229
--- Iter [1102/2000] ---
Total Loss: 2312.0625
MSE Component: 2.2989 (Weighted: 2298.9304)
NLL Component: 13.0445
Min Variance: 5.79e-06
p1=0.249, p2=0.229
--- Iter [1103/2000] ---
Total Loss: 2770.6702
MSE Component: 2.7550 (Weighted: 2754.9891)
NLL Component: 15.5932
Min Variance: 7.69e-06
p1=0.249, p2=0.229
--- Iter [1104/2000] ---
Total Loss: 1809.9657
```

MSE Component: 1.8008 (Weighted: 1800.7960)  
NLL Component: 9.0820  
Min Variance: 2.15e-05  
p1=0.249, p2=0.229  
--- Iter [1105/2000] ---  
Total Loss: 2773.8938  
MSE Component: 2.7591 (Weighted: 2759.0778)  
NLL Component: 14.7282  
Min Variance: 5.12e-06  
p1=0.249, p2=0.229  
--- Iter [1106/2000] ---  
Total Loss: 2206.3447  
MSE Component: 2.1950 (Weighted: 2194.9742)  
NLL Component: 11.2830  
Min Variance: 1.51e-05  
p1=0.249, p2=0.229  
--- Iter [1107/2000] ---  
Total Loss: 1873.2134  
MSE Component: 1.8636 (Weighted: 1863.5712)  
NLL Component: 9.5546  
Min Variance: 6.86e-06  
p1=0.249, p2=0.229  
--- Iter [1108/2000] ---  
Total Loss: 1526.2638  
MSE Component: 1.5090 (Weighted: 1508.9978)  
NLL Component: 17.1784  
Min Variance: 3.78e-06  
p1=0.249, p2=0.229  
--- Iter [1109/2000] ---  
Total Loss: 2842.1863  
MSE Component: 2.8294 (Weighted: 2829.4098)  
NLL Component: 12.6887  
Min Variance: 9.29e-06  
p1=0.249, p2=0.229  
--- Iter [1110/2000] ---  
Total Loss: 1850.1323  
MSE Component: 1.8437 (Weighted: 1843.7264)  
NLL Component: 6.3182  
Min Variance: 1.82e-05  
p1=0.249, p2=0.229  
  
--- Validation at iteration 1110 ---  
Average MSE: 255.9454, Average ANEES: 406.4060

---

--- Iter [1111/2000] ---  
Total Loss: 2102.6836  
MSE Component: 2.0917 (Weighted: 2091.7115)  
NLL Component: 10.8846

Min Variance: 1.73e-05  
p1=0.249, p2=0.229  
--- Iter [1112/2000] ---  
Total Loss: 1649.5559  
MSE Component: 1.6374 (Weighted: 1637.3805)  
NLL Component: 12.0877  
Min Variance: 1.61e-05  
p1=0.249, p2=0.229  
--- Iter [1113/2000] ---  
Total Loss: 2150.2168  
MSE Component: 2.1374 (Weighted: 2137.3832)  
NLL Component: 12.7458  
Min Variance: 1.40e-05  
p1=0.249, p2=0.229  
--- Iter [1114/2000] ---  
Total Loss: 1923.7440  
MSE Component: 1.9114 (Weighted: 1911.4196)  
NLL Component: 12.2367  
Min Variance: 1.98e-05  
p1=0.249, p2=0.229  
--- Iter [1115/2000] ---  
Total Loss: 1522.8334  
MSE Component: 1.5112 (Weighted: 1511.2411)  
NLL Component: 11.5046  
Min Variance: 7.98e-06  
p1=0.249, p2=0.229  
--- Iter [1116/2000] ---  
Total Loss: 2305.9695  
MSE Component: 2.2910 (Weighted: 2290.9787)  
NLL Component: 14.9031  
Min Variance: 2.21e-05  
p1=0.249, p2=0.229  
--- Iter [1117/2000] ---  
Total Loss: 2574.4004  
MSE Component: 2.5640 (Weighted: 2564.0335)  
NLL Component: 10.2793  
Min Variance: 1.63e-05  
p1=0.249, p2=0.229  
--- Iter [1118/2000] ---  
Total Loss: 2537.1985  
MSE Component: 2.5217 (Weighted: 2521.6753)  
NLL Component: 15.4356  
Min Variance: 1.63e-05  
p1=0.249, p2=0.229  
--- Iter [1119/2000] ---  
Total Loss: 2374.4331  
MSE Component: 2.3639 (Weighted: 2363.9109)  
NLL Component: 10.4345

```
Min Variance: 1.27e-05
p1=0.249, p2=0.229
--- Iter [1120/2000] ---
Total Loss: 1835.3845
MSE Component: 1.8244 (Weighted: 1824.4339)
NLL Component: 10.8630
Min Variance: 1.39e-05
p1=0.249, p2=0.229

--- Validation at iteration 1120 ---
Average MSE: 241.1906, Average ANEES: 502.6706
-----
--- Iter [1121/2000] ---
Total Loss: 1895.5765
MSE Component: 1.8805 (Weighted: 1880.5370)
NLL Component: 14.9519
Min Variance: 2.05e-05
p1=0.249, p2=0.229
--- Iter [1122/2000] ---
Total Loss: 1831.5432
MSE Component: 1.8195 (Weighted: 1819.4770)
NLL Component: 11.9786
Min Variance: 1.63e-05
p1=0.249, p2=0.229
--- Iter [1123/2000] ---
Total Loss: 1923.4248
MSE Component: 1.9083 (Weighted: 1908.2664)
NLL Component: 15.0707
Min Variance: 7.15e-06
p1=0.249, p2=0.229
--- Iter [1124/2000] ---
Total Loss: 2922.1997
MSE Component: 2.9109 (Weighted: 2910.8500)
NLL Component: 11.2621
Min Variance: 1.15e-05
p1=0.249, p2=0.229
--- Iter [1125/2000] ---
Total Loss: 2149.3677
MSE Component: 2.1338 (Weighted: 2133.8348)
NLL Component: 15.4450
Min Variance: 1.69e-05
p1=0.249, p2=0.229
--- Iter [1126/2000] ---
Total Loss: 2269.7993
MSE Component: 2.2594 (Weighted: 2259.4311)
NLL Component: 10.2805
Min Variance: 1.91e-05
p1=0.249, p2=0.229
```

```
--- Iter [1127/2000] ---
Total Loss: 1687.2327
MSE Component: 1.6778 (Weighted: 1677.7546)
NLL Component: 9.3903
Min Variance: 2.13e-05
p1=0.249, p2=0.229
--- Iter [1128/2000] ---
Total Loss: 1670.2946
MSE Component: 1.6607 (Weighted: 1660.6562)
NLL Component: 9.5506
Min Variance: 2.28e-05
p1=0.249, p2=0.229
--- Iter [1129/2000] ---
Total Loss: 2154.1985
MSE Component: 2.1457 (Weighted: 2145.6840)
NLL Component: 8.4266
Min Variance: 1.22e-05
p1=0.249, p2=0.229
--- Iter [1130/2000] ---
Total Loss: 1884.2944
MSE Component: 1.8709 (Weighted: 1870.9025)
NLL Component: 13.3042
Min Variance: 1.81e-05
p1=0.249, p2=0.229

--- Validation at iteration 1130 ---
Average MSE: 253.4283, Average ANEES: 429.8016
-----
--- Iter [1131/2000] ---
Total Loss: 2063.1570
MSE Component: 2.0483 (Weighted: 2048.3220)
NLL Component: 14.7473
Min Variance: 1.68e-05
p1=0.249, p2=0.229
--- Iter [1132/2000] ---
Total Loss: 1852.9503
MSE Component: 1.8409 (Weighted: 1840.8556)
NLL Component: 12.0071
Min Variance: 8.03e-06
p1=0.249, p2=0.229
--- Iter [1133/2000] ---
Total Loss: 1937.8729
MSE Component: 1.9280 (Weighted: 1928.0477)
NLL Component: 9.7376
Min Variance: 2.08e-05
p1=0.249, p2=0.229
--- Iter [1134/2000] ---
Total Loss: 1624.6018
```

MSE Component: 1.6106 (Weighted: 1610.6156)  
NLL Component: 13.8986  
Min Variance: 2.33e-05  
p1=0.249, p2=0.229  
--- Iter [1135/2000] ---  
Total Loss: 1847.8890  
MSE Component: 1.8385 (Weighted: 1838.5408)  
NLL Component: 9.2606  
Min Variance: 3.20e-06  
p1=0.249, p2=0.229  
--- Iter [1136/2000] ---  
Total Loss: 1680.1271  
MSE Component: 1.6690 (Weighted: 1668.9820)  
NLL Component: 11.0573  
Min Variance: 1.16e-05  
p1=0.249, p2=0.229  
--- Iter [1137/2000] ---  
Total Loss: 1702.4794  
MSE Component: 1.6884 (Weighted: 1688.4061)  
NLL Component: 13.9856  
Min Variance: 1.25e-05  
p1=0.249, p2=0.229  
--- Iter [1138/2000] ---  
Total Loss: 2010.9973  
MSE Component: 2.0018 (Weighted: 2001.8120)  
NLL Component: 9.0977  
Min Variance: 1.85e-05  
p1=0.249, p2=0.229  
--- Iter [1139/2000] ---  
Total Loss: 1982.2651  
MSE Component: 1.9713 (Weighted: 1971.3483)  
NLL Component: 10.8292  
Min Variance: 2.43e-05  
p1=0.249, p2=0.229  
--- Iter [1140/2000] ---  
Total Loss: 1859.9695  
MSE Component: 1.8436 (Weighted: 1843.5854)  
NLL Component: 16.2965  
Min Variance: 1.85e-05  
p1=0.249, p2=0.229  
  
--- Validation at iteration 1140 ---  
Average MSE: 234.5253, Average ANEES: 467.4264

---

--- Iter [1141/2000] ---  
Total Loss: 1552.8666  
MSE Component: 1.5439 (Weighted: 1543.9291)  
NLL Component: 8.8499

Min Variance: 1.38e-05  
p1=0.249, p2=0.229  
--- Iter [1142/2000] ---  
Total Loss: 2164.5525  
MSE Component: 2.1510 (Weighted: 2150.9669)  
NLL Component: 13.4980  
Min Variance: 9.44e-06  
p1=0.249, p2=0.229  
--- Iter [1143/2000] ---  
Total Loss: 1992.1517  
MSE Component: 1.9771 (Weighted: 1977.1408)  
NLL Component: 14.9233  
Min Variance: 1.21e-05  
p1=0.249, p2=0.229  
--- Iter [1144/2000] ---  
Total Loss: 1878.4584  
MSE Component: 1.8662 (Weighted: 1866.1853)  
NLL Component: 12.1855  
Min Variance: 1.62e-05  
p1=0.249, p2=0.229  
--- Iter [1145/2000] ---  
Total Loss: 1840.9382  
MSE Component: 1.8306 (Weighted: 1830.6153)  
NLL Component: 10.2354  
Min Variance: 1.11e-05  
p1=0.249, p2=0.228  
--- Iter [1146/2000] ---  
Total Loss: 1763.8138  
MSE Component: 1.7512 (Weighted: 1751.1892)  
NLL Component: 12.5370  
Min Variance: 1.03e-05  
p1=0.249, p2=0.228  
--- Iter [1147/2000] ---  
Total Loss: 1867.3312  
MSE Component: 1.8566 (Weighted: 1856.6499)  
NLL Component: 10.5937  
Min Variance: 9.25e-06  
p1=0.249, p2=0.228  
--- Iter [1148/2000] ---  
Total Loss: 1881.8749  
MSE Component: 1.8665 (Weighted: 1866.5138)  
NLL Component: 15.2734  
Min Variance: 1.72e-05  
p1=0.249, p2=0.228  
--- Iter [1149/2000] ---  
Total Loss: 1513.4647  
MSE Component: 1.5021 (Weighted: 1502.0721)  
NLL Component: 11.3049

```

Min Variance: 9.50e-06
p1=0.249, p2=0.228
--- Iter [1150/2000] ---
Total Loss: 1253.7262
MSE Component: 1.2413 (Weighted: 1241.2511)
NLL Component: 12.3874
Min Variance: 1.94e-05
p1=0.249, p2=0.228

--- Validation at iteration 1150 ---
Average MSE: 246.3703, Average ANEES: 435.1221
-----
--- Iter [1151/2000] ---
Total Loss: 1640.5525
MSE Component: 1.6308 (Weighted: 1630.8157)
NLL Component: 9.6490
Min Variance: 1.11e-05
p1=0.249, p2=0.228
--- Iter [1152/2000] ---
Total Loss: 1568.1641
MSE Component: 1.5551 (Weighted: 1555.0979)
NLL Component: 12.9785
Min Variance: 2.30e-05
p1=0.249, p2=0.228
--- Iter [1153/2000] ---
Total Loss: 1581.2190
MSE Component: 1.5716 (Weighted: 1571.5563)
NLL Component: 9.5751
Min Variance: 1.95e-05
p1=0.249, p2=0.228
--- Iter [1154/2000] ---
Total Loss: 1841.3839
MSE Component: 1.8293 (Weighted: 1829.3347)
NLL Component: 11.9615
Min Variance: 2.46e-05
p1=0.249, p2=0.228
--- Iter [1155/2000] ---
Total Loss: 2135.2153
MSE Component: 2.1243 (Weighted: 2124.3422)
NLL Component: 10.7854
Min Variance: 1.38e-05
p1=0.249, p2=0.228
--- Iter [1156/2000] ---
Total Loss: 1599.2488
MSE Component: 1.5880 (Weighted: 1587.9949)
NLL Component: 11.1663
Min Variance: 1.02e-05
p1=0.249, p2=0.228

```

```

--- Iter [1157/2000] ---
Total Loss: 1770.8860
MSE Component: 1.7595 (Weighted: 1759.5210)
NLL Component: 11.2774
Min Variance: 2.42e-05
p1=0.249, p2=0.228
--- Iter [1158/2000] ---
Total Loss: 1813.3285
MSE Component: 1.8020 (Weighted: 1802.0488)
NLL Component: 11.1920
Min Variance: 1.14e-05
p1=0.249, p2=0.228
--- Iter [1159/2000] ---
Total Loss: 1891.5146
MSE Component: 1.8789 (Weighted: 1878.8698)
NLL Component: 12.5573
Min Variance: 1.09e-05
p1=0.249, p2=0.228
--- Iter [1160/2000] ---
Total Loss: 1749.4340
MSE Component: 1.7419 (Weighted: 1741.9209)
NLL Component: 7.4254
Min Variance: 1.13e-05
p1=0.249, p2=0.228

--- Validation at iteration 1160 ---
Average MSE: 252.2712, Average ANEES: 430.7728
-----
--- Iter [1161/2000] ---
Total Loss: 1936.9949
MSE Component: 1.9224 (Weighted: 1922.3725)
NLL Component: 14.5348
Min Variance: 8.99e-06
p1=0.249, p2=0.228
--- Iter [1162/2000] ---
Total Loss: 1579.4620
MSE Component: 1.5690 (Weighted: 1568.9870)
NLL Component: 10.3873
Min Variance: 2.17e-05
p1=0.249, p2=0.228
--- Iter [1163/2000] ---
Total Loss: 1787.1326
MSE Component: 1.7750 (Weighted: 1775.0269)
NLL Component: 12.0180
Min Variance: 1.85e-05
p1=0.248, p2=0.228
--- Iter [1164/2000] ---
Total Loss: 1430.3458

```

MSE Component: 1.4152 (Weighted: 1415.2261)  
NLL Component: 15.0320  
Min Variance: 4.34e-06  
p1=0.248, p2=0.228  
--- Iter [1165/2000] ---  
Total Loss: 1335.8832  
MSE Component: 1.3244 (Weighted: 1324.3805)  
NLL Component: 11.4151  
Min Variance: 9.60e-06  
p1=0.248, p2=0.228  
--- Iter [1166/2000] ---  
Total Loss: 1648.5709  
MSE Component: 1.6406 (Weighted: 1640.6270)  
NLL Component: 7.8561  
Min Variance: 1.53e-05  
p1=0.248, p2=0.228  
--- Iter [1167/2000] ---  
Total Loss: 1722.5140  
MSE Component: 1.7097 (Weighted: 1709.7102)  
NLL Component: 12.7162  
Min Variance: 1.23e-05  
p1=0.248, p2=0.228  
--- Iter [1168/2000] ---  
Total Loss: 1815.3644  
MSE Component: 1.8046 (Weighted: 1804.5753)  
NLL Component: 10.7014  
Min Variance: 1.32e-05  
p1=0.248, p2=0.228  
--- Iter [1169/2000] ---  
Total Loss: 1368.8638  
MSE Component: 1.3550 (Weighted: 1355.0336)  
NLL Component: 13.7424  
Min Variance: 8.26e-06  
p1=0.248, p2=0.228  
--- Iter [1170/2000] ---  
Total Loss: 1983.9688  
MSE Component: 1.9743 (Weighted: 1974.2846)  
NLL Component: 9.5964  
Min Variance: 2.02e-05  
p1=0.248, p2=0.228  
  
--- Validation at iteration 1170 ---  
Average MSE: 260.2808, Average ANEES: 566.4099

---

--- Iter [1171/2000] ---  
Total Loss: 1852.7803  
MSE Component: 1.8399 (Weighted: 1839.8534)  
NLL Component: 12.8392

```
Min Variance: 1.05e-05
p1=0.248, p2=0.228
--- Iter [1172/2000] ---
Total Loss: 2056.7961
MSE Component: 2.0470 (Weighted: 2047.0412)
NLL Component: 9.6674
Min Variance: 9.32e-06
p1=0.248, p2=0.228
--- Iter [1173/2000] ---
Total Loss: 1901.7860
MSE Component: 1.8889 (Weighted: 1888.8956)
NLL Component: 12.8027
Min Variance: 5.15e-06
p1=0.248, p2=0.228
--- Iter [1174/2000] ---
Total Loss: 1860.5375
MSE Component: 1.8511 (Weighted: 1851.0860)
NLL Component: 9.3637
Min Variance: 1.81e-05
p1=0.248, p2=0.228
--- Iter [1175/2000] ---
Total Loss: 1561.1138
MSE Component: 1.5515 (Weighted: 1551.4567)
NLL Component: 9.5695
Min Variance: 2.33e-05
p1=0.248, p2=0.228
--- Iter [1176/2000] ---
Total Loss: 1473.2302
MSE Component: 1.4634 (Weighted: 1463.3515)
NLL Component: 9.7911
Min Variance: 1.45e-05
p1=0.248, p2=0.228
--- Iter [1177/2000] ---
Total Loss: 1796.9235
MSE Component: 1.7854 (Weighted: 1785.4053)
NLL Component: 11.4306
Min Variance: 1.42e-05
p1=0.248, p2=0.228
--- Iter [1178/2000] ---
Total Loss: 2345.8586
MSE Component: 2.3358 (Weighted: 2335.7971)
NLL Component: 9.9740
Min Variance: 5.84e-06
p1=0.248, p2=0.228
--- Iter [1179/2000] ---
Total Loss: 1945.0573
MSE Component: 1.9348 (Weighted: 1934.7587)
NLL Component: 10.2110
```

```
Min Variance: 1.73e-05
p1=0.248, p2=0.228
--- Iter [1180/2000] ---
Total Loss: 1996.5220
MSE Component: 1.9877 (Weighted: 1987.7431)
NLL Component: 8.6912
Min Variance: 1.33e-05
p1=0.248, p2=0.228

--- Validation at iteration 1180 ---
Average MSE: 254.2680, Average ANEES: 478.2787
-----
--- Iter [1181/2000] ---
Total Loss: 2100.8540
MSE Component: 2.0893 (Weighted: 2089.3304)
NLL Component: 11.4361
Min Variance: 1.56e-05
p1=0.248, p2=0.228
--- Iter [1182/2000] ---
Total Loss: 1808.2363
MSE Component: 1.7990 (Weighted: 1799.0044)
NLL Component: 9.1443
Min Variance: 1.47e-05
p1=0.248, p2=0.228
--- Iter [1183/2000] ---
Total Loss: 1580.9056
MSE Component: 1.5718 (Weighted: 1571.7779)
NLL Component: 9.0400
Min Variance: 1.14e-05
p1=0.248, p2=0.228
--- Iter [1184/2000] ---
Total Loss: 1401.3799
MSE Component: 1.3914 (Weighted: 1391.4078)
NLL Component: 9.8844
Min Variance: 2.86e-05
p1=0.248, p2=0.228
--- Iter [1185/2000] ---
Total Loss: 1619.4882
MSE Component: 1.6080 (Weighted: 1608.0372)
NLL Component: 11.3633
Min Variance: 1.97e-05
p1=0.248, p2=0.228
--- Iter [1186/2000] ---
Total Loss: 1801.2233
MSE Component: 1.7916 (Weighted: 1791.6399)
NLL Component: 9.4957
Min Variance: 1.03e-05
p1=0.248, p2=0.228
```

```

--- Iter [1187/2000] ---
Total Loss: 1876.6639
MSE Component: 1.8683 (Weighted: 1868.2508)
NLL Component: 8.3255
Min Variance: 1.86e-05
p1=0.248, p2=0.228
--- Iter [1188/2000] ---
Total Loss: 1965.3076
MSE Component: 1.9525 (Weighted: 1952.4912)
NLL Component: 12.7287
Min Variance: 6.27e-06
p1=0.248, p2=0.228
--- Iter [1189/2000] ---
Total Loss: 1458.8451
MSE Component: 1.4479 (Weighted: 1447.8574)
NLL Component: 10.9000
Min Variance: 2.12e-05
p1=0.248, p2=0.228
--- Iter [1190/2000] ---
Total Loss: 1959.8888
MSE Component: 1.9480 (Weighted: 1947.9550)
NLL Component: 11.8462
Min Variance: 1.29e-05
p1=0.248, p2=0.228

--- Validation at iteration 1190 ---
Average MSE: 235.5751, Average ANEES: 569.5135
-----
--- Iter [1191/2000] ---
Total Loss: 1969.7810
MSE Component: 1.9539 (Weighted: 1953.9169)
NLL Component: 15.7765
Min Variance: 1.51e-05
p1=0.248, p2=0.228
--- Iter [1192/2000] ---
Total Loss: 1281.6642
MSE Component: 1.2694 (Weighted: 1269.3830)
NLL Component: 12.1936
Min Variance: 1.74e-05
p1=0.248, p2=0.228
--- Iter [1193/2000] ---
Total Loss: 1576.4630
MSE Component: 1.5677 (Weighted: 1567.7060)
NLL Component: 8.6694
Min Variance: 2.25e-05
p1=0.248, p2=0.228
--- Iter [1194/2000] ---
Total Loss: 1499.2306

```

MSE Component: 1.4904 (Weighted: 1490.3718)  
NLL Component: 8.7711  
Min Variance: 1.49e-05  
p1=0.248, p2=0.228  
--- Iter [1195/2000] ---  
Total Loss: 1506.8082  
MSE Component: 1.4977 (Weighted: 1497.6690)  
NLL Component: 9.0517  
Min Variance: 1.88e-05  
p1=0.248, p2=0.228  
--- Iter [1196/2000] ---  
Total Loss: 1928.0398  
MSE Component: 1.9173 (Weighted: 1917.3214)  
NLL Component: 10.6308  
Min Variance: 1.90e-05  
p1=0.248, p2=0.228  
--- Iter [1197/2000] ---  
Total Loss: 3252.6040  
MSE Component: 3.2434 (Weighted: 3243.3791)  
NLL Component: 9.1371  
Min Variance: 1.48e-05  
p1=0.248, p2=0.228  
--- Iter [1198/2000] ---  
Total Loss: 2624.1968  
MSE Component: 2.6146 (Weighted: 2614.6007)  
NLL Component: 9.5086  
Min Variance: 7.07e-06  
p1=0.248, p2=0.228  
--- Iter [1199/2000] ---  
Total Loss: 1523.2540  
MSE Component: 1.5119 (Weighted: 1511.9082)  
NLL Component: 11.2582  
Min Variance: 1.95e-05  
p1=0.248, p2=0.228  
--- Iter [1200/2000] ---  
Total Loss: 1815.2312  
MSE Component: 1.8052 (Weighted: 1805.1902)  
NLL Component: 9.9534  
Min Variance: 2.56e-05  
p1=0.248, p2=0.228  
  
--- Validation at iteration 1200 ---  
Average MSE: 235.6473, Average ANEES: 448.0300

---

--- Iter [1201/2000] ---  
Total Loss: 1821.9220  
MSE Component: 1.8117 (Weighted: 1811.6843)  
NLL Component: 10.1501

Min Variance: 8.97e-06  
p1=0.248, p2=0.228  
--- Iter [1202/2000] ---  
Total Loss: 2059.5188  
MSE Component: 2.0471 (Weighted: 2047.1365)  
NLL Component: 12.2946  
Min Variance: 7.94e-06  
p1=0.248, p2=0.228  
--- Iter [1203/2000] ---  
Total Loss: 1581.9269  
MSE Component: 1.5686 (Weighted: 1568.5948)  
NLL Component: 13.2444  
Min Variance: 1.50e-05  
p1=0.248, p2=0.228  
--- Iter [1204/2000] ---  
Total Loss: 2313.4341  
MSE Component: 2.3013 (Weighted: 2301.2738)  
NLL Component: 12.0726  
Min Variance: 6.17e-06  
p1=0.248, p2=0.228  
--- Iter [1205/2000] ---  
Total Loss: 1774.0358  
MSE Component: 1.7653 (Weighted: 1765.2799)  
NLL Component: 8.6682  
Min Variance: 1.37e-05  
p1=0.248, p2=0.228  
--- Iter [1206/2000] ---  
Total Loss: 1962.9166  
MSE Component: 1.9537 (Weighted: 1953.6598)  
NLL Component: 9.1692  
Min Variance: 2.86e-05  
p1=0.248, p2=0.228  
--- Iter [1207/2000] ---  
Total Loss: 1689.1180  
MSE Component: 1.6812 (Weighted: 1681.2441)  
NLL Component: 7.7862  
Min Variance: 1.07e-05  
p1=0.248, p2=0.228  
--- Iter [1208/2000] ---  
Total Loss: 1594.5109  
MSE Component: 1.5841 (Weighted: 1584.1033)  
NLL Component: 10.3198  
Min Variance: 1.56e-05  
p1=0.248, p2=0.228  
--- Iter [1209/2000] ---  
Total Loss: 1595.9034  
MSE Component: 1.5874 (Weighted: 1587.3979)  
NLL Component: 8.4178

```

Min Variance: 1.45e-05
p1=0.248, p2=0.228
--- Iter [1210/2000] ---
Total Loss: 2023.4060
MSE Component: 2.0120 (Weighted: 2011.9932)
NLL Component: 11.3252
Min Variance: 6.90e-06
p1=0.248, p2=0.228

--- Validation at iteration 1210 ---
Average MSE: 232.2415, Average ANEES: 477.7906
-----
--- Iter [1211/2000] ---
Total Loss: 1660.9567
MSE Component: 1.6480 (Weighted: 1647.9948)
NLL Component: 12.8743
Min Variance: 1.77e-05
p1=0.248, p2=0.228
--- Iter [1212/2000] ---
Total Loss: 1348.3278
MSE Component: 1.3395 (Weighted: 1339.4864)
NLL Component: 8.7538
Min Variance: 1.85e-05
p1=0.248, p2=0.228
--- Iter [1213/2000] ---
Total Loss: 1422.2246
MSE Component: 1.4098 (Weighted: 1409.7800)
NLL Component: 12.3569
Min Variance: 1.76e-05
p1=0.248, p2=0.228
--- Iter [1214/2000] ---
Total Loss: 1853.0729
MSE Component: 1.8430 (Weighted: 1843.0020)
NLL Component: 9.9833
Min Variance: 1.15e-05
p1=0.248, p2=0.228
--- Iter [1215/2000] ---
Total Loss: 1899.0267
MSE Component: 1.8898 (Weighted: 1889.8201)
NLL Component: 9.1191
Min Variance: 7.82e-06
p1=0.248, p2=0.228
--- Iter [1216/2000] ---
Total Loss: 2023.9037
MSE Component: 2.0133 (Weighted: 2013.2751)
NLL Component: 10.5409
Min Variance: 1.59e-05
p1=0.248, p2=0.228

```

```
--- Iter [1217/2000] ---
Total Loss: 1655.5220
MSE Component: 1.6464 (Weighted: 1646.4424)
NLL Component: 8.9919
Min Variance: 6.29e-06
p1=0.248, p2=0.228
--- Iter [1218/2000] ---
Total Loss: 1844.7759
MSE Component: 1.8346 (Weighted: 1834.6300)
NLL Component: 10.0582
Min Variance: 1.49e-05
p1=0.248, p2=0.228
--- Iter [1219/2000] ---
Total Loss: 1585.1643
MSE Component: 1.5742 (Weighted: 1574.1731)
NLL Component: 10.9036
Min Variance: 2.68e-06
p1=0.248, p2=0.228
--- Iter [1220/2000] ---
Total Loss: 1803.8743
MSE Component: 1.7960 (Weighted: 1796.0037)
NLL Component: 7.7829
Min Variance: 7.69e-06
p1=0.248, p2=0.228

--- Validation at iteration 1220 ---
Average MSE: 253.3592, Average ANEES: 540.8945
-----
--- Iter [1221/2000] ---
Total Loss: 2460.4253
MSE Component: 2.4530 (Weighted: 2452.9543)
NLL Component: 7.3833
Min Variance: 1.57e-05
p1=0.248, p2=0.228
--- Iter [1222/2000] ---
Total Loss: 1917.2297
MSE Component: 1.9084 (Weighted: 1908.3797)
NLL Component: 8.7624
Min Variance: 2.45e-05
p1=0.248, p2=0.228
--- Iter [1223/2000] ---
Total Loss: 1950.7722
MSE Component: 1.9399 (Weighted: 1939.8642)
NLL Component: 10.8204
Min Variance: 1.31e-05
p1=0.248, p2=0.228
--- Iter [1224/2000] ---
Total Loss: 2174.9353
```

MSE Component: 2.1604 (Weighted: 2160.4049)  
NLL Component: 14.4425  
Min Variance: 4.77e-06  
p1=0.248, p2=0.228  
--- Iter [1225/2000] ---  
Total Loss: 1666.9666  
MSE Component: 1.6560 (Weighted: 1655.9852)  
NLL Component: 10.8937  
Min Variance: 2.61e-05  
p1=0.248, p2=0.228  
--- Iter [1226/2000] ---  
Total Loss: 1443.0997  
MSE Component: 1.4355 (Weighted: 1435.5395)  
NLL Component: 7.4726  
Min Variance: 1.85e-05  
p1=0.248, p2=0.228  
--- Iter [1227/2000] ---  
Total Loss: 1510.2279  
MSE Component: 1.5018 (Weighted: 1501.8266)  
NLL Component: 8.3137  
Min Variance: 2.47e-05  
p1=0.248, p2=0.228  
--- Iter [1228/2000] ---  
Total Loss: 1549.3529  
MSE Component: 1.5384 (Weighted: 1538.3861)  
NLL Component: 10.8792  
Min Variance: 1.42e-05  
p1=0.248, p2=0.228  
--- Iter [1229/2000] ---  
Total Loss: 2006.4432  
MSE Component: 1.9993 (Weighted: 1999.3142)  
NLL Component: 7.0414  
Min Variance: 1.36e-05  
p1=0.248, p2=0.228  
--- Iter [1230/2000] ---  
Total Loss: 1473.1714  
MSE Component: 1.4653 (Weighted: 1465.2580)  
NLL Component: 7.8257  
Min Variance: 1.24e-05  
p1=0.248, p2=0.228  
  
--- Validation at iteration 1230 ---  
Average MSE: 232.3261, Average ANEES: 399.2243

---

--- Iter [1231/2000] ---  
Total Loss: 2182.7803  
MSE Component: 2.1750 (Weighted: 2175.0188)  
NLL Component: 7.6737

Min Variance: 9.46e-06  
p1=0.248, p2=0.228  
--- Iter [1232/2000] ---  
Total Loss: 2107.3672  
MSE Component: 2.0966 (Weighted: 2096.6253)  
NLL Component: 10.6543  
Min Variance: 6.50e-06  
p1=0.248, p2=0.228  
--- Iter [1233/2000] ---  
Total Loss: 1958.3807  
MSE Component: 1.9470 (Weighted: 1947.0283)  
NLL Component: 11.2648  
Min Variance: 9.63e-06  
p1=0.248, p2=0.228  
--- Iter [1234/2000] ---  
Total Loss: 2055.0588  
MSE Component: 2.0464 (Weighted: 2046.3657)  
NLL Component: 8.6055  
Min Variance: 1.60e-05  
p1=0.248, p2=0.228  
--- Iter [1235/2000] ---  
Total Loss: 1700.1582  
MSE Component: 1.6896 (Weighted: 1689.6013)  
NLL Component: 10.4692  
Min Variance: 2.05e-05  
p1=0.248, p2=0.228  
--- Iter [1236/2000] ---  
Total Loss: 2032.6552  
MSE Component: 2.0234 (Weighted: 2023.3760)  
NLL Component: 9.1916  
Min Variance: 2.41e-05  
p1=0.248, p2=0.228  
--- Iter [1237/2000] ---  
Total Loss: 2455.9377  
MSE Component: 2.4454 (Weighted: 2445.3857)  
NLL Component: 10.4645  
Min Variance: 8.32e-06  
p1=0.248, p2=0.228  
--- Iter [1238/2000] ---  
Total Loss: 1970.2255  
MSE Component: 1.9620 (Weighted: 1961.9797)  
NLL Component: 8.1581  
Min Variance: 4.70e-06  
p1=0.248, p2=0.228  
--- Iter [1239/2000] ---  
Total Loss: 1393.1390  
MSE Component: 1.3836 (Weighted: 1383.6365)  
NLL Component: 9.4149

```

Min Variance: 1.46e-05
p1=0.248, p2=0.228
--- Iter [1240/2000] ---
Total Loss: 2323.1531
MSE Component: 2.3129 (Weighted: 2312.9287)
NLL Component: 10.1367
Min Variance: 2.64e-05
p1=0.248, p2=0.227

--- Validation at iteration 1240 ---
Average MSE: 231.0343, Average ANEES: 441.5256
-----
--- Iter [1241/2000] ---
Total Loss: 1990.9054
MSE Component: 1.9830 (Weighted: 1982.9676)
NLL Component: 7.8500
Min Variance: 1.68e-05
p1=0.248, p2=0.227
--- Iter [1242/2000] ---
Total Loss: 2093.5303
MSE Component: 2.0851 (Weighted: 2085.0654)
NLL Component: 8.3773
Min Variance: 1.36e-05
p1=0.248, p2=0.227
--- Iter [1243/2000] ---
Total Loss: 1549.1327
MSE Component: 1.5424 (Weighted: 1542.4099)
NLL Component: 6.6353
Min Variance: 2.06e-05
p1=0.248, p2=0.227
--- Iter [1244/2000] ---
Total Loss: 1784.4860
MSE Component: 1.7749 (Weighted: 1774.8640)
NLL Component: 9.5344
Min Variance: 1.14e-05
p1=0.248, p2=0.227
--- Iter [1245/2000] ---
Total Loss: 1322.8682
MSE Component: 1.3148 (Weighted: 1314.7554)
NLL Component: 8.0252
Min Variance: 1.37e-05
p1=0.248, p2=0.227
--- Iter [1246/2000] ---
Total Loss: 1498.5631
MSE Component: 1.4904 (Weighted: 1490.3944)
NLL Component: 8.0811
Min Variance: 1.32e-05
p1=0.248, p2=0.227

```

```
--- Iter [1247/2000] ---
Total Loss: 1508.6808
MSE Component: 1.4977 (Weighted: 1497.7158)
NLL Component: 10.8774
Min Variance: 1.32e-05
p1=0.248, p2=0.227
--- Iter [1248/2000] ---
Total Loss: 1250.6832
MSE Component: 1.2443 (Weighted: 1244.2811)
NLL Component: 6.3147
Min Variance: 1.74e-05
p1=0.247, p2=0.227
--- Iter [1249/2000] ---
Total Loss: 1808.1722
MSE Component: 1.7956 (Weighted: 1795.5812)
NLL Component: 12.5035
Min Variance: 1.58e-05
p1=0.247, p2=0.227
--- Iter [1250/2000] ---
Total Loss: 1582.5521
MSE Component: 1.5742 (Weighted: 1574.2302)
NLL Component: 8.2344
Min Variance: 1.82e-05
p1=0.247, p2=0.227

--- Validation at iteration 1250 ---
Average MSE: 227.8307, Average ANEES: 442.9035
-----
--- Iter [1251/2000] ---
Total Loss: 1842.3994
MSE Component: 1.8338 (Weighted: 1833.8121)
NLL Component: 8.4998
Min Variance: 1.87e-05
p1=0.247, p2=0.227
--- Iter [1252/2000] ---
Total Loss: 1555.5538
MSE Component: 1.5469 (Weighted: 1546.8640)
NLL Component: 8.6023
Min Variance: 1.49e-05
p1=0.247, p2=0.227
--- Iter [1253/2000] ---
Total Loss: 1621.6464
MSE Component: 1.6122 (Weighted: 1612.1804)
NLL Component: 9.3785
Min Variance: 1.56e-05
p1=0.247, p2=0.227
--- Iter [1254/2000] ---
Total Loss: 1414.2731
```

MSE Component: 1.4049 (Weighted: 1404.9126)  
NLL Component: 9.2730  
Min Variance: 2.47e-05  
p1=0.247, p2=0.227  
--- Iter [1255/2000] ---  
Total Loss: 1386.2452  
MSE Component: 1.3795 (Weighted: 1379.4593)  
NLL Component: 6.6985  
Min Variance: 4.13e-06  
p1=0.247, p2=0.227  
--- Iter [1256/2000] ---  
Total Loss: 1470.9237  
MSE Component: 1.4621 (Weighted: 1462.0931)  
NLL Component: 8.7430  
Min Variance: 2.10e-05  
p1=0.247, p2=0.227  
--- Iter [1257/2000] ---  
Total Loss: 2068.9451  
MSE Component: 2.0583 (Weighted: 2058.2521)  
NLL Component: 10.6051  
Min Variance: 1.84e-05  
p1=0.247, p2=0.227  
--- Iter [1258/2000] ---  
Total Loss: 2073.3164  
MSE Component: 2.0653 (Weighted: 2065.3117)  
NLL Component: 7.9170  
Min Variance: 9.71e-06  
p1=0.247, p2=0.227  
--- Iter [1259/2000] ---  
Total Loss: 2221.5444  
MSE Component: 2.2103 (Weighted: 2210.3002)  
NLL Component: 11.1566  
Min Variance: 3.74e-06  
p1=0.247, p2=0.227  
--- Iter [1260/2000] ---  
Total Loss: 1889.8306  
MSE Component: 1.8803 (Weighted: 1880.2829)  
NLL Component: 9.4602  
Min Variance: 9.03e-06  
p1=0.247, p2=0.227

--- Validation at iteration 1260 ---  
Average MSE: 253.7447, Average ANEES: 452.3375

-----  
--- Iter [1261/2000] ---  
Total Loss: 1493.2019  
MSE Component: 1.4845 (Weighted: 1484.4528)  
NLL Component: 8.6615

```
Min Variance: 1.72e-05
p1=0.247, p2=0.227
--- Iter [1262/2000] ---
Total Loss: 1539.7327
MSE Component: 1.5323 (Weighted: 1532.3279)
NLL Component: 7.3173
Min Variance: 7.90e-06
p1=0.247, p2=0.227
--- Iter [1263/2000] ---
Total Loss: 1444.3567
MSE Component: 1.4354 (Weighted: 1435.3691)
NLL Component: 8.9000
Min Variance: 2.35e-05
p1=0.247, p2=0.227
--- Iter [1264/2000] ---
Total Loss: 1267.6157
MSE Component: 1.2581 (Weighted: 1258.1340)
NLL Component: 9.3942
Min Variance: 1.16e-05
p1=0.247, p2=0.227
--- Iter [1265/2000] ---
Total Loss: 1794.7894
MSE Component: 1.7834 (Weighted: 1783.4185)
NLL Component: 11.2833
Min Variance: 1.49e-05
p1=0.247, p2=0.227
--- Iter [1266/2000] ---
Total Loss: 1156.8479
MSE Component: 1.1490 (Weighted: 1149.0411)
NLL Component: 7.7194
Min Variance: 1.53e-05
p1=0.247, p2=0.227
--- Iter [1267/2000] ---
Total Loss: 1496.1460
MSE Component: 1.4861 (Weighted: 1486.0867)
NLL Component: 9.9719
Min Variance: 1.87e-05
p1=0.247, p2=0.227
--- Iter [1268/2000] ---
Total Loss: 1694.3281
MSE Component: 1.6878 (Weighted: 1687.7886)
NLL Component: 6.4520
Min Variance: 1.06e-05
p1=0.247, p2=0.227
--- Iter [1269/2000] ---
Total Loss: 1674.3143
MSE Component: 1.6643 (Weighted: 1664.3059)
NLL Component: 9.9209
```

```

Min Variance: 1.95e-05
p1=0.247, p2=0.227
--- Iter [1270/2000] ---
Total Loss: 1806.3925
MSE Component: 1.7979 (Weighted: 1797.9194)
NLL Component: 8.3855
Min Variance: 8.26e-06
p1=0.247, p2=0.227

--- Validation at iteration 1270 ---
Average MSE: 244.5103, Average ANEES: 435.3880
-----
--- Iter [1271/2000] ---
Total Loss: 1443.0546
MSE Component: 1.4337 (Weighted: 1433.7245)
NLL Component: 9.2426
Min Variance: 2.45e-05
p1=0.247, p2=0.227
--- Iter [1272/2000] ---
Total Loss: 1482.6702
MSE Component: 1.4737 (Weighted: 1473.7486)
NLL Component: 8.8341
Min Variance: 2.66e-06
p1=0.247, p2=0.227
--- Iter [1273/2000] ---
Total Loss: 1410.3915
MSE Component: 1.4020 (Weighted: 1402.0236)
NLL Component: 8.2804
Min Variance: 6.85e-06
p1=0.247, p2=0.227
--- Iter [1274/2000] ---
Total Loss: 1492.8746
MSE Component: 1.4830 (Weighted: 1483.0235)
NLL Component: 9.7635
Min Variance: 1.16e-05
p1=0.247, p2=0.227
--- Iter [1275/2000] ---
Total Loss: 1600.0841
MSE Component: 1.5903 (Weighted: 1590.3473)
NLL Component: 9.6493
Min Variance: 1.93e-05
p1=0.247, p2=0.227
--- Iter [1276/2000] ---
Total Loss: 1824.0592
MSE Component: 1.8131 (Weighted: 1813.0664)
NLL Component: 10.9052
Min Variance: 1.78e-05
p1=0.247, p2=0.227

```

```
--- Iter [1277/2000] ---
Total Loss: 1376.6508
MSE Component: 1.3697 (Weighted: 1369.7013)
NLL Component: 6.8619
Min Variance: 2.62e-05
p1=0.247, p2=0.227
--- Iter [1278/2000] ---
Total Loss: 1277.8414
MSE Component: 1.2708 (Weighted: 1270.7816)
NLL Component: 6.9723
Min Variance: 2.71e-05
p1=0.247, p2=0.227
--- Iter [1279/2000] ---
Total Loss: 1229.7411
MSE Component: 1.2242 (Weighted: 1224.2217)
NLL Component: 5.4319
Min Variance: 2.08e-05
p1=0.247, p2=0.227
--- Iter [1280/2000] ---
Total Loss: 1494.1208
MSE Component: 1.4820 (Weighted: 1482.0008)
NLL Component: 12.0325
Min Variance: 4.82e-06
p1=0.247, p2=0.227

--- Validation at iteration 1280 ---
Average MSE: 243.6643, Average ANEES: 394.9841
-----
--- Iter [1281/2000] ---
Total Loss: 1421.5728
MSE Component: 1.4131 (Weighted: 1413.1488)
NLL Component: 8.3364
Min Variance: 2.18e-05
p1=0.247, p2=0.227
--- Iter [1282/2000] ---
Total Loss: 2178.4795
MSE Component: 2.1700 (Weighted: 2169.9705)
NLL Component: 8.4215
Min Variance: 9.29e-06
p1=0.247, p2=0.227
--- Iter [1283/2000] ---
Total Loss: 1626.6736
MSE Component: 1.6185 (Weighted: 1618.5178)
NLL Component: 8.0683
Min Variance: 2.16e-05
p1=0.247, p2=0.227
--- Iter [1284/2000] ---
Total Loss: 1323.5879
```

MSE Component: 1.3149 (Weighted: 1314.8562)  
NLL Component: 8.6442  
Min Variance: 1.18e-05  
p1=0.247, p2=0.227  
--- Iter [1285/2000] ---  
Total Loss: 1657.0048  
MSE Component: 1.6496 (Weighted: 1649.6286)  
NLL Component: 7.2886  
Min Variance: 8.48e-06  
p1=0.247, p2=0.227  
--- Iter [1286/2000] ---  
Total Loss: 1851.8379  
MSE Component: 1.8449 (Weighted: 1844.8925)  
NLL Component: 6.8579  
Min Variance: 6.85e-06  
p1=0.247, p2=0.227  
--- Iter [1287/2000] ---  
Total Loss: 1497.1116  
MSE Component: 1.4886 (Weighted: 1488.5811)  
NLL Component: 8.4430  
Min Variance: 1.54e-05  
p1=0.247, p2=0.227  
--- Iter [1288/2000] ---  
Total Loss: 1981.1470  
MSE Component: 1.9715 (Weighted: 1971.5439)  
NLL Component: 9.5154  
Min Variance: 2.02e-05  
p1=0.247, p2=0.227  
--- Iter [1289/2000] ---  
Total Loss: 1744.5109  
MSE Component: 1.7345 (Weighted: 1734.4854)  
NLL Component: 9.9380  
Min Variance: 1.22e-05  
p1=0.247, p2=0.227  
--- Iter [1290/2000] ---  
Total Loss: 1319.1450  
MSE Component: 1.3124 (Weighted: 1312.3759)  
NLL Component: 6.6816  
Min Variance: 2.19e-05  
p1=0.247, p2=0.227  
  
--- Validation at iteration 1290 ---  
Average MSE: 240.0076, Average ANEES: 509.3979

---

--- Iter [1291/2000] ---  
Total Loss: 1558.0905  
MSE Component: 1.5505 (Weighted: 1550.4537)  
NLL Component: 7.5493

```
Min Variance: 1.61e-05
p1=0.247, p2=0.227
--- Iter [1292/2000] ---
Total Loss: 1138.2168
MSE Component: 1.1307 (Weighted: 1130.7032)
NLL Component: 7.4260
Min Variance: 2.78e-05
p1=0.247, p2=0.227
--- Iter [1293/2000] ---
Total Loss: 1469.6422
MSE Component: 1.4625 (Weighted: 1462.4966)
NLL Component: 7.0581
Min Variance: 1.88e-05
p1=0.247, p2=0.227
--- Iter [1294/2000] ---
Total Loss: 1692.6027
MSE Component: 1.6864 (Weighted: 1686.3515)
NLL Component: 6.1636
Min Variance: 1.69e-05
p1=0.247, p2=0.227
--- Iter [1295/2000] ---
Total Loss: 1706.1311
MSE Component: 1.6940 (Weighted: 1693.9915)
NLL Component: 12.0520
Min Variance: 1.04e-05
p1=0.247, p2=0.227
--- Iter [1296/2000] ---
Total Loss: 2061.6992
MSE Component: 2.0523 (Weighted: 2052.2766)
NLL Component: 9.3351
Min Variance: 2.18e-05
p1=0.247, p2=0.227
--- Iter [1297/2000] ---
Total Loss: 1448.5707
MSE Component: 1.4374 (Weighted: 1437.3856)
NLL Component: 11.0976
Min Variance: 1.98e-05
p1=0.247, p2=0.227
--- Iter [1298/2000] ---
Total Loss: 2311.0562
MSE Component: 2.3024 (Weighted: 2302.4104)
NLL Component: 8.5581
Min Variance: 1.51e-05
p1=0.247, p2=0.227
--- Iter [1299/2000] ---
Total Loss: 3013.5513
MSE Component: 3.0057 (Weighted: 3005.7437)
NLL Component: 7.7200
```

```
Min Variance: 1.96e-05
p1=0.247, p2=0.227
--- Iter [1300/2000] ---
Total Loss: 2768.2793
MSE Component: 2.7605 (Weighted: 2760.5174)
NLL Component: 7.6742
Min Variance: 2.22e-05
p1=0.247, p2=0.227

--- Validation at iteration 1300 ---
Average MSE: 252.9736, Average ANEES: 433.5722
-----
--- Iter [1301/2000] ---
Total Loss: 1853.9153
MSE Component: 1.8464 (Weighted: 1846.3911)
NLL Component: 7.4366
Min Variance: 1.61e-05
p1=0.247, p2=0.227
--- Iter [1302/2000] ---
Total Loss: 2511.5798
MSE Component: 2.5047 (Weighted: 2504.6682)
NLL Component: 6.8242
Min Variance: 2.15e-05
p1=0.247, p2=0.227
--- Iter [1303/2000] ---
Total Loss: 1559.0574
MSE Component: 1.5495 (Weighted: 1549.4771)
NLL Component: 9.4929
Min Variance: 1.26e-05
p1=0.247, p2=0.227
--- Iter [1304/2000] ---
Total Loss: 2138.6541
MSE Component: 2.1310 (Weighted: 2130.9767)
NLL Component: 7.5902
Min Variance: 5.02e-06
p1=0.247, p2=0.227
--- Iter [1305/2000] ---
Total Loss: 2660.3420
MSE Component: 2.6506 (Weighted: 2650.5597)
NLL Component: 9.6951
Min Variance: 1.39e-05
p1=0.247, p2=0.227
--- Iter [1306/2000] ---
Total Loss: 3274.7178
MSE Component: 3.2654 (Weighted: 3265.4493)
NLL Component: 9.1813
Min Variance: 1.17e-05
p1=0.247, p2=0.227
```

```
--- Iter [1307/2000] ---
Total Loss: 2014.8302
MSE Component: 2.0054 (Weighted: 2005.3523)
NLL Component: 9.3904
Min Variance: 2.44e-05
p1=0.247, p2=0.227
--- Iter [1308/2000] ---
Total Loss: 1705.7765
MSE Component: 1.6988 (Weighted: 1698.7720)
NLL Component: 6.9170
Min Variance: 1.69e-05
p1=0.247, p2=0.227
--- Iter [1309/2000] ---
Total Loss: 1993.1901
MSE Component: 1.9830 (Weighted: 1982.9851)
NLL Component: 10.1174
Min Variance: 1.13e-05
p1=0.246, p2=0.227
--- Iter [1310/2000] ---
Total Loss: 2057.6848
MSE Component: 2.0490 (Weighted: 2049.0315)
NLL Component: 8.5660
Min Variance: 1.39e-05
p1=0.246, p2=0.227

--- Validation at iteration 1310 ---
Average MSE: 268.4529, Average ANEES: 335.7333
-----
--- Iter [1311/2000] ---
Total Loss: 1587.6947
MSE Component: 1.5783 (Weighted: 1578.2965)
NLL Component: 9.3107
Min Variance: 1.29e-05
p1=0.246, p2=0.227
--- Iter [1312/2000] ---
Total Loss: 1696.3964
MSE Component: 1.6885 (Weighted: 1688.4974)
NLL Component: 7.8114
Min Variance: 1.84e-05
p1=0.246, p2=0.227
--- Iter [1313/2000] ---
Total Loss: 1258.9371
MSE Component: 1.2517 (Weighted: 1251.6549)
NLL Component: 7.1946
Min Variance: 1.54e-05
p1=0.246, p2=0.227
--- Iter [1314/2000] ---
Total Loss: 1249.7391
```

MSE Component: 1.2443 (Weighted: 1244.3191)  
NLL Component: 5.3326  
Min Variance: 1.82e-05  
p1=0.246, p2=0.227  
--- Iter [1315/2000] ---  
Total Loss: 1423.3069  
MSE Component: 1.4161 (Weighted: 1416.0579)  
NLL Component: 7.1613  
Min Variance: 2.28e-05  
p1=0.246, p2=0.227  
--- Iter [1316/2000] ---  
Total Loss: 1665.2515  
MSE Component: 1.6586 (Weighted: 1658.6151)  
NLL Component: 6.5488  
Min Variance: 1.43e-05  
p1=0.246, p2=0.227  
--- Iter [1317/2000] ---  
Total Loss: 1703.6970  
MSE Component: 1.6959 (Weighted: 1695.9221)  
NLL Component: 7.6874  
Min Variance: 1.69e-05  
p1=0.246, p2=0.227  
--- Iter [1318/2000] ---  
Total Loss: 2114.9741  
MSE Component: 2.1017 (Weighted: 2101.6738)  
NLL Component: 13.2129  
Min Variance: 6.87e-06  
p1=0.246, p2=0.227  
--- Iter [1319/2000] ---  
Total Loss: 1885.7860  
MSE Component: 1.8773 (Weighted: 1877.2900)  
NLL Component: 8.4084  
Min Variance: 7.19e-06  
p1=0.246, p2=0.227  
--- Iter [1320/2000] ---  
Total Loss: 1389.3051  
MSE Component: 1.3829 (Weighted: 1382.9325)  
NLL Component: 6.2850  
Min Variance: 2.55e-05  
p1=0.246, p2=0.227  
  
--- Validation at iteration 1320 ---  
Average MSE: 244.7806, Average ANEES: 420.7690

---

--- Iter [1321/2000] ---  
Total Loss: 1739.3552  
MSE Component: 1.7284 (Weighted: 1728.4226)  
NLL Component: 10.8451

Min Variance: 1.13e-05  
p1=0.246, p2=0.227  
--- Iter [1322/2000] ---  
Total Loss: 1979.0138  
MSE Component: 1.9709 (Weighted: 1970.9245)  
NLL Component: 8.0018  
Min Variance: 1.09e-05  
p1=0.246, p2=0.227  
--- Iter [1323/2000] ---  
Total Loss: 2781.8638  
MSE Component: 2.7759 (Weighted: 2775.9175)  
NLL Component: 5.8588  
Min Variance: 1.67e-05  
p1=0.246, p2=0.227  
--- Iter [1324/2000] ---  
Total Loss: 2546.9128  
MSE Component: 2.5391 (Weighted: 2539.0534)  
NLL Component: 7.7720  
Min Variance: 1.75e-05  
p1=0.246, p2=0.227  
--- Iter [1325/2000] ---  
Total Loss: 1872.0121  
MSE Component: 1.8640 (Weighted: 1864.0260)  
NLL Component: 7.8986  
Min Variance: 1.63e-05  
p1=0.246, p2=0.227  
--- Iter [1326/2000] ---  
Total Loss: 1124.3597  
MSE Component: 1.1185 (Weighted: 1118.4540)  
NLL Component: 5.8182  
Min Variance: 9.07e-06  
p1=0.246, p2=0.227  
--- Iter [1327/2000] ---  
Total Loss: 1453.7098  
MSE Component: 1.4444 (Weighted: 1444.4422)  
NLL Component: 9.1802  
Min Variance: 1.63e-05  
p1=0.246, p2=0.227  
--- Iter [1328/2000] ---  
Total Loss: 1100.4094  
MSE Component: 1.0946 (Weighted: 1094.6347)  
NLL Component: 5.6873  
Min Variance: 1.42e-05  
p1=0.246, p2=0.227  
--- Iter [1329/2000] ---  
Total Loss: 2043.8716  
MSE Component: 2.0333 (Weighted: 2033.3292)  
NLL Component: 10.4549

```

Min Variance: 1.12e-05
p1=0.246, p2=0.227
--- Iter [1330/2000] ---
Total Loss: 2499.1045
MSE Component: 2.4914 (Weighted: 2491.3859)
NLL Component: 7.6312
Min Variance: 1.54e-05
p1=0.246, p2=0.227

--- Validation at iteration 1330 ---
Average MSE: 238.0153, Average ANEES: 433.7715
-----
--- Iter [1331/2000] ---
Total Loss: 1998.3743
MSE Component: 1.9895 (Weighted: 1989.5107)
NLL Component: 8.7761
Min Variance: 1.29e-05
p1=0.246, p2=0.227
--- Iter [1332/2000] ---
Total Loss: 1142.9305
MSE Component: 1.1368 (Weighted: 1136.7728)
NLL Component: 6.0703
Min Variance: 2.39e-05
p1=0.246, p2=0.227
--- Iter [1333/2000] ---
Total Loss: 1329.6373
MSE Component: 1.3201 (Weighted: 1320.1418)
NLL Component: 9.4080
Min Variance: 1.40e-05
p1=0.246, p2=0.227
--- Iter [1334/2000] ---
Total Loss: 1353.0846
MSE Component: 1.3442 (Weighted: 1344.1886)
NLL Component: 8.8085
Min Variance: 1.66e-05
p1=0.246, p2=0.227
--- Iter [1335/2000] ---
Total Loss: 1336.1086
MSE Component: 1.3289 (Weighted: 1328.9446)
NLL Component: 7.0765
Min Variance: 1.33e-05
p1=0.246, p2=0.227
--- Iter [1336/2000] ---
Total Loss: 1512.5685
MSE Component: 1.5031 (Weighted: 1503.1321)
NLL Component: 9.3489
Min Variance: 9.31e-06
p1=0.246, p2=0.227

```

```
--- Iter [1337/2000] ---
Total Loss: 1318.8749
MSE Component: 1.3129 (Weighted: 1312.9272)
NLL Component: 5.8601
Min Variance: 1.26e-05
p1=0.246, p2=0.227
--- Iter [1338/2000] ---
Total Loss: 1453.8427
MSE Component: 1.4480 (Weighted: 1447.9891)
NLL Component: 5.7659
Min Variance: 1.65e-05
p1=0.246, p2=0.227
--- Iter [1339/2000] ---
Total Loss: 1255.8435
MSE Component: 1.2491 (Weighted: 1249.1091)
NLL Component: 6.6468
Min Variance: 1.27e-05
p1=0.246, p2=0.227
--- Iter [1340/2000] ---
Total Loss: 1311.0532
MSE Component: 1.3027 (Weighted: 1302.6603)
NLL Component: 8.3053
Min Variance: 8.17e-06
p1=0.246, p2=0.227

--- Validation at iteration 1340 ---
Average MSE: 270.3512, Average ANEES: 375.9817
-----
--- Iter [1341/2000] ---
Total Loss: 1614.5811
MSE Component: 1.6073 (Weighted: 1607.2879)
NLL Component: 7.2057
Min Variance: 2.29e-05
p1=0.246, p2=0.227
--- Iter [1342/2000] ---
Total Loss: 2256.2302
MSE Component: 2.2504 (Weighted: 2250.4313)
NLL Component: 5.7113
Min Variance: 1.77e-05
p1=0.246, p2=0.227
--- Iter [1343/2000] ---
Total Loss: 1260.8579
MSE Component: 1.2514 (Weighted: 1251.3999)
NLL Component: 9.3705
Min Variance: 1.53e-05
p1=0.246, p2=0.227
--- Iter [1344/2000] ---
Total Loss: 1859.4503
```

MSE Component: 1.8496 (Weighted: 1849.5938)  
 NLL Component: 9.7691  
 Min Variance: 1.74e-05  
 p1=0.246, p2=0.227  
 --- Iter [1345/2000] ---  
 Total Loss: 1685.0663  
 MSE Component: 1.6765 (Weighted: 1676.5376)  
 NLL Component: 8.4411  
 Min Variance: 1.36e-05  
 p1=0.246, p2=0.227  
 --- Iter [1346/2000] ---  
 Total Loss: 1364.1919  
 MSE Component: 1.3545 (Weighted: 1354.4909)  
 NLL Component: 9.6136  
 Min Variance: 1.73e-05  
 p1=0.246, p2=0.227  
 --- Iter [1347/2000] ---  
 Total Loss: 1290.4846  
 MSE Component: 1.2836 (Weighted: 1283.6000)  
 NLL Component: 6.7972  
 Min Variance: 1.18e-05  
 p1=0.246, p2=0.227  
 --- Iter [1348/2000] ---  
 Total Loss: 1682.0437  
 MSE Component: 1.6732 (Weighted: 1673.1813)  
 NLL Component: 8.7749  
 Min Variance: 2.22e-05  
 p1=0.246, p2=0.226  
 --- Iter [1349/2000] ---  
 Total Loss: 2069.9839  
 MSE Component: 2.0621 (Weighted: 2062.0687)  
 NLL Component: 7.8280  
 Min Variance: 1.74e-05  
 p1=0.246, p2=0.226  
 --- Iter [1350/2000] ---  
 Total Loss: 1317.9242  
 MSE Component: 1.3129 (Weighted: 1312.8747)  
 NLL Component: 4.9621  
 Min Variance: 2.16e-05  
 p1=0.246, p2=0.226  
  
 --- Validation at iteration 1350 ---  
 Average MSE: 239.9473, Average ANEES: 361.6680

---

--- Iter [1351/2000] ---  
 Total Loss: 1486.9116  
 MSE Component: 1.4806 (Weighted: 1480.5565)  
 NLL Component: 6.2676

Min Variance: 1.42e-05  
p1=0.246, p2=0.226  
--- Iter [1352/2000] ---  
Total Loss: 1840.1313  
MSE Component: 1.8323 (Weighted: 1832.2623)  
NLL Component: 7.7814  
Min Variance: 1.33e-05  
p1=0.246, p2=0.226  
--- Iter [1353/2000] ---  
Total Loss: 1180.2712  
MSE Component: 1.1734 (Weighted: 1173.3552)  
NLL Component: 6.8285  
Min Variance: 8.10e-06  
p1=0.246, p2=0.226  
--- Iter [1354/2000] ---  
Total Loss: 1539.4365  
MSE Component: 1.5307 (Weighted: 1530.6658)  
NLL Component: 8.6832  
Min Variance: 9.76e-06  
p1=0.246, p2=0.226  
--- Iter [1355/2000] ---  
Total Loss: 1214.2678  
MSE Component: 1.2093 (Weighted: 1209.3394)  
NLL Component: 4.8410  
Min Variance: 2.23e-05  
p1=0.246, p2=0.226  
--- Iter [1356/2000] ---  
Total Loss: 1461.8042  
MSE Component: 1.4512 (Weighted: 1451.2353)  
NLL Component: 10.4813  
Min Variance: 1.20e-05  
p1=0.246, p2=0.226  
--- Iter [1357/2000] ---  
Total Loss: 1373.6785  
MSE Component: 1.3663 (Weighted: 1366.2691)  
NLL Component: 7.3218  
Min Variance: 1.88e-05  
p1=0.246, p2=0.226  
--- Iter [1358/2000] ---  
Total Loss: 1594.4358  
MSE Component: 1.5855 (Weighted: 1585.4722)  
NLL Component: 8.8761  
Min Variance: 1.13e-05  
p1=0.246, p2=0.226  
--- Iter [1359/2000] ---  
Total Loss: 1051.3663  
MSE Component: 1.0462 (Weighted: 1046.1502)  
NLL Component: 5.1286

```
Min Variance: 1.14e-05
p1=0.246, p2=0.226
--- Iter [1360/2000] ---
Total Loss: 1178.9139
MSE Component: 1.1707 (Weighted: 1170.7419)
NLL Component: 8.0844
Min Variance: 1.51e-05
p1=0.246, p2=0.226

--- Validation at iteration 1360 ---
Average MSE: 237.8660, Average ANEES: 370.0790
-----
--- Iter [1361/2000] ---
Total Loss: 1265.5609
MSE Component: 1.2565 (Weighted: 1256.4700)
NLL Component: 9.0034
Min Variance: 1.79e-05
p1=0.246, p2=0.226
--- Iter [1362/2000] ---
Total Loss: 1624.7653
MSE Component: 1.6177 (Weighted: 1617.7044)
NLL Component: 6.9734
Min Variance: 1.34e-05
p1=0.246, p2=0.226
--- Iter [1363/2000] ---
Total Loss: 1205.9672
MSE Component: 1.1986 (Weighted: 1198.5672)
NLL Component: 7.3125
Min Variance: 7.78e-06
p1=0.246, p2=0.226
--- Iter [1364/2000] ---
Total Loss: 1401.3689
MSE Component: 1.3954 (Weighted: 1395.3502)
NLL Component: 5.9311
Min Variance: 1.02e-05
p1=0.246, p2=0.226
--- Iter [1365/2000] ---
Total Loss: 1665.5583
MSE Component: 1.6590 (Weighted: 1659.0208)
NLL Component: 6.4501
Min Variance: 2.33e-05
p1=0.246, p2=0.226
--- Iter [1366/2000] ---
Total Loss: 1229.5023
MSE Component: 1.2220 (Weighted: 1222.0340)
NLL Component: 7.3809
Min Variance: 1.41e-05
p1=0.246, p2=0.226
```

```
--- Iter [1367/2000] ---
Total Loss: 1568.6174
MSE Component: 1.5608 (Weighted: 1560.8063)
NLL Component: 7.7237
Min Variance: 1.12e-05
p1=0.246, p2=0.226
--- Iter [1368/2000] ---
Total Loss: 1478.3130
MSE Component: 1.4672 (Weighted: 1467.2318)
NLL Component: 10.9937
Min Variance: 5.38e-06
p1=0.246, p2=0.226
--- Iter [1369/2000] ---
Total Loss: 1570.5464
MSE Component: 1.5629 (Weighted: 1562.8699)
NLL Component: 7.5890
Min Variance: 1.15e-05
p1=0.246, p2=0.226
--- Iter [1370/2000] ---
Total Loss: 1338.1097
MSE Component: 1.3306 (Weighted: 1330.5997)
NLL Component: 7.4226
Min Variance: 7.16e-06
p1=0.246, p2=0.226

--- Validation at iteration 1370 ---
Average MSE: 254.3763, Average ANEES: 375.8485
-----
--- Iter [1371/2000] ---
Total Loss: 1071.9116
MSE Component: 1.0659 (Weighted: 1065.8571)
NLL Component: 5.9671
Min Variance: 9.92e-06
p1=0.246, p2=0.226
--- Iter [1372/2000] ---
Total Loss: 1385.2213
MSE Component: 1.3767 (Weighted: 1376.6608)
NLL Component: 8.4730
Min Variance: 1.91e-05
p1=0.246, p2=0.226
--- Iter [1373/2000] ---
Total Loss: 1412.6741
MSE Component: 1.4049 (Weighted: 1404.9358)
NLL Component: 7.6508
Min Variance: 2.66e-05
p1=0.246, p2=0.226
--- Iter [1374/2000] ---
Total Loss: 1358.1915
```

MSE Component: 1.3503 (Weighted: 1350.3145)  
NLL Component: 7.7896  
Min Variance: 2.20e-05  
p1=0.246, p2=0.226  
--- Iter [1375/2000] ---  
Total Loss: 1546.2119  
MSE Component: 1.5401 (Weighted: 1540.0640)  
NLL Component: 6.0604  
Min Variance: 2.58e-05  
p1=0.246, p2=0.226  
--- Iter [1376/2000] ---  
Total Loss: 1359.8340  
MSE Component: 1.3493 (Weighted: 1349.2540)  
NLL Component: 10.4924  
Min Variance: 2.74e-05  
p1=0.246, p2=0.226  
--- Iter [1377/2000] ---  
Total Loss: 1646.6888  
MSE Component: 1.6396 (Weighted: 1639.6176)  
NLL Component: 6.9838  
Min Variance: 7.05e-06  
p1=0.246, p2=0.226  
--- Iter [1378/2000] ---  
Total Loss: 1341.6843  
MSE Component: 1.3370 (Weighted: 1337.0306)  
NLL Component: 4.5662  
Min Variance: 1.16e-05  
p1=0.246, p2=0.226  
--- Iter [1379/2000] ---  
Total Loss: 1387.5095  
MSE Component: 1.3817 (Weighted: 1381.7455)  
NLL Component: 5.6765  
Min Variance: 1.85e-05  
p1=0.246, p2=0.226  
--- Iter [1380/2000] ---  
Total Loss: 1353.1599  
MSE Component: 1.3483 (Weighted: 1348.2504)  
NLL Component: 4.8220  
Min Variance: 2.27e-05  
p1=0.246, p2=0.226  
  
--- Validation at iteration 1380 ---  
Average MSE: 245.2112, Average ANEES: 327.1545

---

--- Iter [1381/2000] ---  
Total Loss: 1879.3225  
MSE Component: 1.8726 (Weighted: 1872.6131)  
NLL Component: 6.6220

Min Variance: 7.48e-06  
p1=0.246, p2=0.226  
--- Iter [1382/2000] ---  
Total Loss: 1348.8153  
MSE Component: 1.3429 (Weighted: 1342.8987)  
NLL Component: 5.8291  
Min Variance: 8.10e-06  
p1=0.246, p2=0.226  
--- Iter [1383/2000] ---  
Total Loss: 1648.2006  
MSE Component: 1.6392 (Weighted: 1639.1779)  
NLL Component: 8.9351  
Min Variance: 8.36e-06  
p1=0.246, p2=0.226  
--- Iter [1384/2000] ---  
Total Loss: 1437.1979  
MSE Component: 1.4300 (Weighted: 1430.0253)  
NLL Component: 7.0850  
Min Variance: 1.63e-05  
p1=0.246, p2=0.226  
--- Iter [1385/2000] ---  
Total Loss: 1272.9027  
MSE Component: 1.2664 (Weighted: 1266.3763)  
NLL Component: 6.4389  
Min Variance: 1.52e-05  
p1=0.245, p2=0.226  
--- Iter [1386/2000] ---  
Total Loss: 1494.9954  
MSE Component: 1.4858 (Weighted: 1485.8208)  
NLL Component: 9.0870  
Min Variance: 1.54e-05  
p1=0.245, p2=0.226  
--- Iter [1387/2000] ---  
Total Loss: 1799.3297  
MSE Component: 1.7931 (Weighted: 1793.0746)  
NLL Component: 6.1676  
Min Variance: 1.39e-05  
p1=0.245, p2=0.226  
--- Iter [1388/2000] ---  
Total Loss: 1828.1854  
MSE Component: 1.8215 (Weighted: 1821.5357)  
NLL Component: 6.5621  
Min Variance: 2.41e-05  
p1=0.245, p2=0.226  
--- Iter [1389/2000] ---  
Total Loss: 2041.4124  
MSE Component: 2.0362 (Weighted: 2036.1521)  
NLL Component: 5.1727

```

Min Variance: 1.24e-05
p1=0.245, p2=0.226
--- Iter [1390/2000] ---
Total Loss: 1766.1780
MSE Component: 1.7591 (Weighted: 1759.1014)
NLL Component: 6.9890
Min Variance: 1.52e-05
p1=0.245, p2=0.226

--- Validation at iteration 1390 ---
Average MSE: 282.0817, Average ANEES: 328.5463
-----
--- Iter [1391/2000] ---
Total Loss: 1590.1118
MSE Component: 1.5829 (Weighted: 1582.8910)
NLL Component: 7.1333
Min Variance: 2.81e-05
p1=0.245, p2=0.226
--- Iter [1392/2000] ---
Total Loss: 1188.8429
MSE Component: 1.1813 (Weighted: 1181.2788)
NLL Component: 7.4767
Min Variance: 1.16e-05
p1=0.245, p2=0.226
--- Iter [1393/2000] ---
Total Loss: 1311.4438
MSE Component: 1.3035 (Weighted: 1303.4766)
NLL Component: 7.8799
Min Variance: 8.90e-06
p1=0.245, p2=0.226
--- Iter [1394/2000] ---
Total Loss: 1668.6613
MSE Component: 1.6630 (Weighted: 1662.9648)
NLL Component: 5.6090
Min Variance: 1.08e-05
p1=0.245, p2=0.226
--- Iter [1395/2000] ---
Total Loss: 2274.2737
MSE Component: 2.2661 (Weighted: 2266.1052)
NLL Component: 8.0811
Min Variance: 1.40e-05
p1=0.245, p2=0.226
--- Iter [1396/2000] ---
Total Loss: 1801.8298
MSE Component: 1.7946 (Weighted: 1794.6228)
NLL Component: 7.1197
Min Variance: 7.67e-06
p1=0.245, p2=0.226

```

```
--- Iter [1397/2000] ---
Total Loss: 1990.5944
MSE Component: 1.9841 (Weighted: 1984.0536)
NLL Component: 6.4533
Min Variance: 1.32e-05
p1=0.245, p2=0.226
--- Iter [1398/2000] ---
Total Loss: 1228.5153
MSE Component: 1.2225 (Weighted: 1222.4858)
NLL Component: 5.9420
Min Variance: 7.14e-06
p1=0.245, p2=0.226
--- Iter [1399/2000] ---
Total Loss: 1428.9537
MSE Component: 1.4223 (Weighted: 1422.3144)
NLL Component: 6.5519
Min Variance: 1.30e-05
p1=0.245, p2=0.226
--- Iter [1400/2000] ---
Total Loss: 1335.0413
MSE Component: 1.3300 (Weighted: 1330.0492)
NLL Component: 4.9046
Min Variance: 2.17e-05
p1=0.245, p2=0.226

--- Validation at iteration 1400 ---
Average MSE: 268.2328, Average ANEES: 317.5333
-----
--- Iter [1401/2000] ---
Total Loss: 1498.8779
MSE Component: 1.4925 (Weighted: 1492.5174)
NLL Component: 6.2731
Min Variance: 1.70e-05
p1=0.245, p2=0.226
--- Iter [1402/2000] ---
Total Loss: 2346.3818
MSE Component: 2.3396 (Weighted: 2339.6409)
NLL Component: 6.6535
Min Variance: 1.42e-05
p1=0.245, p2=0.226
--- Iter [1403/2000] ---
Total Loss: 2586.7861
MSE Component: 2.5797 (Weighted: 2579.7439)
NLL Component: 6.9547
Min Variance: 1.56e-05
p1=0.245, p2=0.226
--- Iter [1404/2000] ---
Total Loss: 2722.3579
```

MSE Component: 2.7138 (Weighted: 2713.8252)  
NLL Component: 8.4453  
Min Variance: 1.38e-05  
p1=0.245, p2=0.226  
--- Iter [1405/2000] ---  
Total Loss: 2156.2332  
MSE Component: 2.1515 (Weighted: 2151.4745)  
NLL Component: 4.6714  
Min Variance: 7.46e-06  
p1=0.245, p2=0.226  
--- Iter [1406/2000] ---  
Total Loss: 2830.7463  
MSE Component: 2.8241 (Weighted: 2824.1403)  
NLL Component: 6.5186  
Min Variance: 7.66e-06  
p1=0.245, p2=0.226  
--- Iter [1407/2000] ---  
Total Loss: 2964.0410  
MSE Component: 2.9564 (Weighted: 2956.3756)  
NLL Component: 7.5780  
Min Variance: 1.11e-05  
p1=0.245, p2=0.226  
--- Iter [1408/2000] ---  
Total Loss: 1955.2805  
MSE Component: 1.9511 (Weighted: 1951.1459)  
NLL Component: 4.0472  
Min Variance: 2.59e-05  
p1=0.245, p2=0.226  
--- Iter [1409/2000] ---  
Total Loss: 1201.2068  
MSE Component: 1.1942 (Weighted: 1194.2283)  
NLL Component: 6.8912  
Min Variance: 2.14e-05  
p1=0.245, p2=0.226  
--- Iter [1410/2000] ---  
Total Loss: 1376.7061  
MSE Component: 1.3684 (Weighted: 1368.3945)  
NLL Component: 8.2241  
Min Variance: 1.16e-05  
p1=0.245, p2=0.226  
  
--- Validation at iteration 1410 ---  
Average MSE: 246.0851, Average ANEES: 402.0652

---

--- Iter [1411/2000] ---  
Total Loss: 1638.9253  
MSE Component: 1.6321 (Weighted: 1632.1115)  
NLL Component: 6.7263

Min Variance: 1.37e-05  
p1=0.245, p2=0.226  
--- Iter [1412/2000] ---  
Total Loss: 1891.8046  
MSE Component: 1.8844 (Weighted: 1884.4296)  
NLL Component: 7.2876  
Min Variance: 9.41e-06  
p1=0.245, p2=0.226  
--- Iter [1413/2000] ---  
Total Loss: 2878.6064  
MSE Component: 2.8714 (Weighted: 2871.4170)  
NLL Component: 7.1022  
Min Variance: 2.31e-05  
p1=0.245, p2=0.226  
--- Iter [1414/2000] ---  
Total Loss: 3086.1321  
MSE Component: 3.0782 (Weighted: 3078.2413)  
NLL Component: 7.8032  
Min Variance: 1.08e-05  
p1=0.245, p2=0.226  
--- Iter [1415/2000] ---  
Total Loss: 3360.1870  
MSE Component: 3.3528 (Weighted: 3352.7770)  
NLL Component: 7.3225  
Min Variance: 1.49e-05  
p1=0.245, p2=0.226  
--- Iter [1416/2000] ---  
Total Loss: 1842.4321  
MSE Component: 1.8349 (Weighted: 1834.8873)  
NLL Component: 7.4576  
Min Variance: 1.92e-05  
p1=0.245, p2=0.226  
--- Iter [1417/2000] ---  
Total Loss: 2604.0798  
MSE Component: 2.5970 (Weighted: 2597.0263)  
NLL Component: 6.9662  
Min Variance: 8.62e-06  
p1=0.245, p2=0.226  
--- Iter [1418/2000] ---  
Total Loss: 1906.8954  
MSE Component: 1.9004 (Weighted: 1900.4186)  
NLL Component: 6.3894  
Min Variance: 1.14e-05  
p1=0.245, p2=0.226  
--- Iter [1419/2000] ---  
Total Loss: 2306.3787  
MSE Component: 2.2983 (Weighted: 2298.2950)  
NLL Component: 7.9963

```
Min Variance: 7.32e-06
p1=0.245, p2=0.226
--- Iter [1420/2000] ---
Total Loss: 1690.0928
MSE Component: 1.6834 (Weighted: 1683.3751)
NLL Component: 6.6302
Min Variance: 8.65e-06
p1=0.245, p2=0.226

--- Validation at iteration 1420 ---
Average MSE: 262.8923, Average ANEES: 310.6575
-----
--- Iter [1421/2000] ---
Total Loss: 1584.9132
MSE Component: 1.5789 (Weighted: 1578.9074)
NLL Component: 5.9184
Min Variance: 7.60e-06
p1=0.245, p2=0.226
--- Iter [1422/2000] ---
Total Loss: 2147.9673
MSE Component: 2.1430 (Weighted: 2142.9882)
NLL Component: 4.8915
Min Variance: 8.74e-06
p1=0.245, p2=0.226
--- Iter [1423/2000] ---
Total Loss: 2188.7314
MSE Component: 2.1831 (Weighted: 2183.1114)
NLL Component: 5.5326
Min Variance: 2.50e-05
p1=0.245, p2=0.226
--- Iter [1424/2000] ---
Total Loss: 2188.8831
MSE Component: 2.1826 (Weighted: 2182.6398)
NLL Component: 6.1557
Min Variance: 3.11e-05
p1=0.245, p2=0.226
--- Iter [1425/2000] ---
Total Loss: 2976.5876
MSE Component: 2.9678 (Weighted: 2967.7963)
NLL Component: 8.7038
Min Variance: 2.74e-05
p1=0.245, p2=0.226
--- Iter [1426/2000] ---
Total Loss: 2036.8175
MSE Component: 2.0316 (Weighted: 2031.6083)
NLL Component: 5.1217
Min Variance: 1.12e-05
p1=0.245, p2=0.226
```

```

--- Iter [1427/2000] ---
Total Loss: 1113.4806
MSE Component: 1.1077 (Weighted: 1107.7194)
NLL Component: 5.6737
Min Variance: 2.03e-05
p1=0.245, p2=0.226
--- Iter [1428/2000] ---
Total Loss: 1301.6724
MSE Component: 1.2964 (Weighted: 1296.3896)
NLL Component: 5.1955
Min Variance: 1.17e-05
p1=0.245, p2=0.226
--- Iter [1429/2000] ---
Total Loss: 2000.5497
MSE Component: 1.9922 (Weighted: 1992.2034)
NLL Component: 8.2589
Min Variance: 1.07e-05
p1=0.245, p2=0.226
--- Iter [1430/2000] ---
Total Loss: 1842.7599
MSE Component: 1.8371 (Weighted: 1837.1497)
NLL Component: 5.5227
Min Variance: 1.08e-05
p1=0.245, p2=0.226

--- Validation at iteration 1430 ---
Average MSE: 246.1793, Average ANEES: 300.8818
-----
--- Iter [1431/2000] ---
Total Loss: 1944.9137
MSE Component: 1.9386 (Weighted: 1938.5971)
NLL Component: 6.2293
Min Variance: 1.47e-05
p1=0.245, p2=0.226
--- Iter [1432/2000] ---
Total Loss: 1513.5815
MSE Component: 1.5076 (Weighted: 1507.5817)
NLL Component: 5.9125
Min Variance: 5.41e-06
p1=0.245, p2=0.226
--- Iter [1433/2000] ---
Total Loss: 1549.7244
MSE Component: 1.5438 (Weighted: 1543.7719)
NLL Component: 5.8651
Min Variance: 1.20e-05
p1=0.245, p2=0.226
--- Iter [1434/2000] ---
Total Loss: 1560.7942

```

MSE Component: 1.5530 (Weighted: 1552.9896)  
NLL Component: 7.7172  
Min Variance: 2.34e-05  
p1=0.245, p2=0.226  
--- Iter [1435/2000] ---  
Total Loss: 1225.4862  
MSE Component: 1.2187 (Weighted: 1218.7202)  
NLL Component: 6.6786  
Min Variance: 1.03e-05  
p1=0.245, p2=0.226  
--- Iter [1436/2000] ---  
Total Loss: 1228.1576  
MSE Component: 1.2220 (Weighted: 1221.9620)  
NLL Component: 6.1083  
Min Variance: 2.20e-05  
p1=0.245, p2=0.226  
--- Iter [1437/2000] ---  
Total Loss: 1572.1069  
MSE Component: 1.5664 (Weighted: 1566.4166)  
NLL Component: 5.6029  
Min Variance: 1.74e-05  
p1=0.245, p2=0.226  
--- Iter [1438/2000] ---  
Total Loss: 2968.5632  
MSE Component: 2.9632 (Weighted: 2963.1927)  
NLL Component: 5.2832  
Min Variance: 1.99e-05  
p1=0.245, p2=0.226  
--- Iter [1439/2000] ---  
Total Loss: 2273.5762  
MSE Component: 2.2676 (Weighted: 2267.6046)  
NLL Component: 5.8842  
Min Variance: 1.16e-05  
p1=0.245, p2=0.226  
--- Iter [1440/2000] ---  
Total Loss: 1297.3198  
MSE Component: 1.2912 (Weighted: 1291.2306)  
NLL Component: 6.0018  
Min Variance: 1.81e-05  
p1=0.245, p2=0.226  
  
--- Validation at iteration 1440 ---  
Average MSE: 255.3219, Average ANEES: 242.9697  
>>> New best VALIDATION ANEES! Saving model. <<<  
-----  
--- Iter [1441/2000] ---  
Total Loss: 1470.1575  
MSE Component: 1.4637 (Weighted: 1463.6557)

NLL Component: 6.4143  
Min Variance: 7.77e-06  
p1=0.245, p2=0.226  
--- Iter [1442/2000] ---  
Total Loss: 1110.9323  
MSE Component: 1.1066 (Weighted: 1106.5737)  
NLL Component: 4.2711  
Min Variance: 8.51e-06  
p1=0.245, p2=0.226  
--- Iter [1443/2000] ---  
Total Loss: 1593.1899  
MSE Component: 1.5858 (Weighted: 1585.8045)  
NLL Component: 7.2981  
Min Variance: 2.11e-05  
p1=0.245, p2=0.226  
--- Iter [1444/2000] ---  
Total Loss: 2204.9231  
MSE Component: 2.1969 (Weighted: 2196.8732)  
NLL Component: 7.9623  
Min Variance: 8.51e-06  
p1=0.245, p2=0.226  
--- Iter [1445/2000] ---  
Total Loss: 2672.3098  
MSE Component: 2.6641 (Weighted: 2664.0699)  
NLL Component: 8.1526  
Min Variance: 9.14e-06  
p1=0.245, p2=0.226  
--- Iter [1446/2000] ---  
Total Loss: 3088.9744  
MSE Component: 3.0816 (Weighted: 3081.6405)  
NLL Component: 7.2466  
Min Variance: 9.20e-06  
p1=0.245, p2=0.226  
--- Iter [1447/2000] ---  
Total Loss: 2512.2234  
MSE Component: 2.5044 (Weighted: 2504.4141)  
NLL Component: 7.7219  
Min Variance: 1.77e-05  
p1=0.245, p2=0.226  
--- Iter [1448/2000] ---  
Total Loss: 1851.9711  
MSE Component: 1.8424 (Weighted: 1842.3688)  
NLL Component: 9.5147  
Min Variance: 9.69e-06  
p1=0.245, p2=0.226  
--- Iter [1449/2000] ---  
Total Loss: 2656.4863  
MSE Component: 2.6488 (Weighted: 2648.7701)

```

NLL Component: 7.6288
Min Variance: 7.29e-06
p1=0.245, p2=0.226
--- Iter [1450/2000] ---
Total Loss: 1479.9414
MSE Component: 1.4754 (Weighted: 1475.4366)
NLL Component: 4.4174
Min Variance: 8.86e-06
p1=0.245, p2=0.226

--- Validation at iteration 1450 ---
Average MSE: 247.9010, Average ANEES: 319.7101
-----
--- Iter [1451/2000] ---
Total Loss: 1552.0609
MSE Component: 1.5462 (Weighted: 1546.1665)
NLL Component: 5.8070
Min Variance: 1.40e-05
p1=0.245, p2=0.226
--- Iter [1452/2000] ---
Total Loss: 2340.7231
MSE Component: 2.3329 (Weighted: 2332.8655)
NLL Component: 7.7702
Min Variance: 1.15e-05
p1=0.245, p2=0.226
--- Iter [1453/2000] ---
Total Loss: 1815.4004
MSE Component: 1.8095 (Weighted: 1809.5311)
NLL Component: 5.7819
Min Variance: 2.10e-05
p1=0.245, p2=0.226
--- Iter [1454/2000] ---
Total Loss: 1988.5447
MSE Component: 1.9828 (Weighted: 1982.8244)
NLL Component: 5.6328
Min Variance: 1.99e-05
p1=0.245, p2=0.226
--- Iter [1455/2000] ---
Total Loss: 2081.7373
MSE Component: 2.0745 (Weighted: 2074.4741)
NLL Component: 7.1757
Min Variance: 3.37e-05
p1=0.245, p2=0.226
--- Iter [1456/2000] ---
Total Loss: 1426.9995
MSE Component: 1.4217 (Weighted: 1421.7103)
NLL Component: 5.2019
Min Variance: 9.30e-06

```

```

p1=0.245, p2=0.226
--- Iter [1457/2000] ---
Total Loss: 2000.6586
MSE Component: 1.9966 (Weighted: 1996.5873)
NLL Component: 3.9839
Min Variance: 2.29e-05
p1=0.245, p2=0.226
--- Iter [1458/2000] ---
Total Loss: 1977.1141
MSE Component: 1.9707 (Weighted: 1970.6956)
NLL Component: 6.3312
Min Variance: 9.12e-06
p1=0.245, p2=0.226
--- Iter [1459/2000] ---
Total Loss: 1463.6101
MSE Component: 1.4579 (Weighted: 1457.8980)
NLL Component: 5.6246
Min Variance: 1.52e-05
p1=0.245, p2=0.226
--- Iter [1460/2000] ---
Total Loss: 1364.6116
MSE Component: 1.3577 (Weighted: 1357.7451)
NLL Component: 6.7792
Min Variance: 1.39e-05
p1=0.245, p2=0.226

--- Validation at iteration 1460 ---
Average MSE: 257.6984, Average ANEES: 260.3833
-----
--- Iter [1461/2000] ---
Total Loss: 1718.2565
MSE Component: 1.7105 (Weighted: 1710.5154)
NLL Component: 7.6537
Min Variance: 5.80e-06
p1=0.245, p2=0.226
--- Iter [1462/2000] ---
Total Loss: 2094.4119
MSE Component: 2.0886 (Weighted: 2088.6114)
NLL Component: 5.7131
Min Variance: 1.00e-05
p1=0.245, p2=0.226
--- Iter [1463/2000] ---
Total Loss: 1931.7466
MSE Component: 1.9239 (Weighted: 1923.8969)
NLL Component: 7.7623
Min Variance: 7.60e-06
p1=0.245, p2=0.226
--- Iter [1464/2000] ---

```

```

Total Loss: 1917.7096
MSE Component: 1.9060 (Weighted: 1906.0193)
NLL Component: 11.6029
Min Variance: 1.97e-05
p1=0.245, p2=0.226
--- Iter [1465/2000] ---
Total Loss: 2283.4763
MSE Component: 2.2762 (Weighted: 2276.2358)
NLL Component: 7.1531
Min Variance: 1.49e-05
p1=0.245, p2=0.226
--- Iter [1466/2000] ---
Total Loss: 2241.3833
MSE Component: 2.2359 (Weighted: 2235.8673)
NLL Component: 5.4288
Min Variance: 1.07e-05
p1=0.245, p2=0.226
--- Iter [1467/2000] ---
Total Loss: 1896.2189
MSE Component: 1.8874 (Weighted: 1887.3502)
NLL Component: 8.7812
Min Variance: 9.33e-06
p1=0.245, p2=0.226
--- Iter [1468/2000] ---
Total Loss: 1399.5316
MSE Component: 1.3921 (Weighted: 1392.1001)
NLL Component: 7.3441
Min Variance: 1.11e-05
p1=0.245, p2=0.226
--- Iter [1469/2000] ---
Total Loss: 1781.1823
MSE Component: 1.7746 (Weighted: 1774.5610)
NLL Component: 6.5338
Min Variance: 1.71e-05
p1=0.245, p2=0.226
--- Iter [1470/2000] ---
Total Loss: 2313.4805
MSE Component: 2.3095 (Weighted: 2309.5429)
NLL Component: 3.8501
Min Variance: 2.56e-05
p1=0.245, p2=0.225

--- Validation at iteration 1470 ---
Average MSE: 259.2405, Average ANEES: 343.2393
-----
--- Iter [1471/2000] ---
Total Loss: 1394.9739
MSE Component: 1.3881 (Weighted: 1388.1029)

```

NLL Component: 6.7835  
Min Variance: 1.84e-05  
p1=0.245, p2=0.225  
--- Iter [1472/2000] ---  
Total Loss: 1806.9059  
MSE Component: 1.7994 (Weighted: 1799.4425)  
NLL Component: 7.3759  
Min Variance: 3.61e-06  
p1=0.245, p2=0.225  
--- Iter [1473/2000] ---  
Total Loss: 2340.2893  
MSE Component: 2.3345 (Weighted: 2334.5253)  
NLL Component: 5.6766  
Min Variance: 1.25e-05  
p1=0.245, p2=0.225  
--- Iter [1474/2000] ---  
Total Loss: 2186.1135  
MSE Component: 2.1809 (Weighted: 2180.9239)  
NLL Component: 5.1022  
Min Variance: 4.55e-06  
p1=0.245, p2=0.225  
--- Iter [1475/2000] ---  
Total Loss: 1497.5394  
MSE Component: 1.4923 (Weighted: 1492.3354)  
NLL Component: 5.1166  
Min Variance: 1.94e-05  
p1=0.245, p2=0.225  
--- Iter [1476/2000] ---  
Total Loss: 1319.1826  
MSE Component: 1.3146 (Weighted: 1314.6293)  
NLL Component: 4.4660  
Min Variance: 3.70e-05  
p1=0.245, p2=0.225  
--- Iter [1477/2000] ---  
Total Loss: 1726.0349  
MSE Component: 1.7194 (Weighted: 1719.3514)  
NLL Component: 6.5961  
Min Variance: 1.15e-05  
p1=0.244, p2=0.225  
--- Iter [1478/2000] ---  
Total Loss: 1835.9700  
MSE Component: 1.8322 (Weighted: 1832.1702)  
NLL Component: 3.7123  
Min Variance: 6.10e-06  
p1=0.244, p2=0.225  
--- Iter [1479/2000] ---  
Total Loss: 2516.4053  
MSE Component: 2.5095 (Weighted: 2509.5427)

NLL Component: 6.7751  
Min Variance: 8.00e-06  
p1=0.244, p2=0.225  
--- Iter [1480/2000] ---  
Total Loss: 1819.6400  
MSE Component: 1.8113 (Weighted: 1811.3365)  
NLL Component: 8.2161  
Min Variance: 1.64e-05  
p1=0.244, p2=0.225

--- Validation at iteration 1480 ---  
Average MSE: 258.3401, Average ANEES: 262.0510

-----  
--- Iter [1481/2000] ---  
Total Loss: 1730.6721  
MSE Component: 1.7246 (Weighted: 1724.5673)  
NLL Component: 6.0175  
Min Variance: 1.25e-05  
p1=0.244, p2=0.225  
--- Iter [1482/2000] ---  
Total Loss: 2029.1206  
MSE Component: 2.0199 (Weighted: 2019.8593)  
NLL Component: 9.1739  
Min Variance: 8.01e-06  
p1=0.244, p2=0.225  
--- Iter [1483/2000] ---  
Total Loss: 2552.4551  
MSE Component: 2.5466 (Weighted: 2546.6096)  
NLL Component: 5.7581  
Min Variance: 1.39e-05  
p1=0.244, p2=0.225  
--- Iter [1484/2000] ---  
Total Loss: 2052.7263  
MSE Component: 2.0434 (Weighted: 2043.4442)  
NLL Component: 9.1948  
Min Variance: 1.25e-05  
p1=0.244, p2=0.225  
--- Iter [1485/2000] ---  
Total Loss: 1518.3092  
MSE Component: 1.5126 (Weighted: 1512.6364)  
NLL Component: 5.5853  
Min Variance: 8.36e-06  
p1=0.244, p2=0.225  
--- Iter [1486/2000] ---  
Total Loss: 1698.1456  
MSE Component: 1.6903 (Weighted: 1690.3398)  
NLL Component: 7.7184  
Min Variance: 1.52e-05

```

p1=0.244, p2=0.225
--- Iter [1487/2000] ---
Total Loss: 2321.9993
MSE Component: 2.3162 (Weighted: 2316.1898)
NLL Component: 5.7221
Min Variance: 1.12e-05
p1=0.244, p2=0.225
--- Iter [1488/2000] ---
Total Loss: 2303.3401
MSE Component: 2.2975 (Weighted: 2297.4715)
NLL Component: 5.7813
Min Variance: 2.43e-05
p1=0.244, p2=0.225
--- Iter [1489/2000] ---
Total Loss: 2358.6770
MSE Component: 2.3537 (Weighted: 2353.7385)
NLL Component: 4.8511
Min Variance: 1.28e-05
p1=0.244, p2=0.225
--- Iter [1490/2000] ---
Total Loss: 1642.8082
MSE Component: 1.6375 (Weighted: 1637.5228)
NLL Component: 5.1980
Min Variance: 8.13e-06
p1=0.244, p2=0.225

--- Validation at iteration 1490 ---
Average MSE: 252.7287, Average ANEES: 323.2602
-----
--- Iter [1491/2000] ---
Total Loss: 1552.5402
MSE Component: 1.5473 (Weighted: 1547.2596)
NLL Component: 5.1932
Min Variance: 1.85e-05
p1=0.244, p2=0.225
--- Iter [1492/2000] ---
Total Loss: 1547.6075
MSE Component: 1.5420 (Weighted: 1541.9797)
NLL Component: 5.5405
Min Variance: 8.92e-06
p1=0.244, p2=0.225
--- Iter [1493/2000] ---
Total Loss: 1852.5092
MSE Component: 1.8451 (Weighted: 1845.1422)
NLL Component: 7.2795
Min Variance: 1.47e-05
p1=0.244, p2=0.225
--- Iter [1494/2000] ---

```

```

Total Loss: 1384.3990
MSE Component: 1.3768 (Weighted: 1376.8454)
NLL Component: 7.4663
Min Variance: 9.41e-06
p1=0.244, p2=0.225
--- Iter [1495/2000] ---
Total Loss: 1391.3075
MSE Component: 1.3840 (Weighted: 1384.0238)
NLL Component: 7.1962
Min Variance: 6.55e-06
p1=0.244, p2=0.225
--- Iter [1496/2000] ---
Total Loss: 2128.4126
MSE Component: 2.1218 (Weighted: 2121.8190)
NLL Component: 6.5060
Min Variance: 1.36e-05
p1=0.244, p2=0.225
--- Iter [1497/2000] ---
Total Loss: 1812.1418
MSE Component: 1.8062 (Weighted: 1806.2352)
NLL Component: 5.8192
Min Variance: 1.69e-05
p1=0.244, p2=0.225
--- Iter [1498/2000] ---
Total Loss: 1934.5945
MSE Component: 1.9289 (Weighted: 1928.9113)
NLL Component: 5.5957
Min Variance: 9.26e-06
p1=0.244, p2=0.225
--- Iter [1499/2000] ---
Total Loss: 2376.9761
MSE Component: 2.3703 (Weighted: 2370.2610)
NLL Component: 6.6277
Min Variance: 6.07e-06
p1=0.244, p2=0.225
--- Iter [1500/2000] ---
Total Loss: 1947.4365
MSE Component: 1.9410 (Weighted: 1940.9713)
NLL Component: 6.3778
Min Variance: 7.94e-06
p1=0.244, p2=0.225

--- Validation at iteration 1500 ---
Average MSE: 264.6550, Average ANEES: 243.4066
-----
--- Iter [1501/2000] ---
Total Loss: 1456.3308
MSE Component: 1.4506 (Weighted: 1450.6484)

```

NLL Component: 5.5949  
Min Variance: 1.14e-05  
p1=0.244, p2=0.225  
--- Iter [1502/2000] ---  
Total Loss: 1952.4147  
MSE Component: 1.9461 (Weighted: 1946.0589)  
NLL Component: 6.2684  
Min Variance: 1.91e-05  
p1=0.244, p2=0.225  
--- Iter [1503/2000] ---  
Total Loss: 1429.8615  
MSE Component: 1.4239 (Weighted: 1423.8619)  
NLL Component: 5.9122  
Min Variance: 1.66e-05  
p1=0.244, p2=0.225  
--- Iter [1504/2000] ---  
Total Loss: 1729.9264  
MSE Component: 1.7243 (Weighted: 1724.2955)  
NLL Component: 5.5435  
Min Variance: 1.78e-05  
p1=0.244, p2=0.225  
--- Iter [1505/2000] ---  
Total Loss: 1226.5070  
MSE Component: 1.2199 (Weighted: 1219.8756)  
NLL Component: 6.5439  
Min Variance: 1.82e-05  
p1=0.244, p2=0.225  
--- Iter [1506/2000] ---  
Total Loss: 1460.7118  
MSE Component: 1.4533 (Weighted: 1453.2753)  
NLL Component: 7.3492  
Min Variance: 1.91e-05  
p1=0.244, p2=0.225  
--- Iter [1507/2000] ---  
Total Loss: 1602.0526  
MSE Component: 1.5966 (Weighted: 1596.6233)  
NLL Component: 5.3419  
Min Variance: 1.32e-05  
p1=0.244, p2=0.225  
--- Iter [1508/2000] ---  
Total Loss: 1619.7603  
MSE Component: 1.6143 (Weighted: 1614.2936)  
NLL Component: 5.3793  
Min Variance: 1.17e-05  
p1=0.244, p2=0.225  
--- Iter [1509/2000] ---  
Total Loss: 1346.6934  
MSE Component: 1.3425 (Weighted: 1342.5065)

NLL Component: 4.0995  
Min Variance: 2.17e-05  
p1=0.244, p2=0.225  
--- Iter [1510/2000] ---  
Total Loss: 1291.8351  
MSE Component: 1.2865 (Weighted: 1286.4972)  
NLL Component: 5.2505  
Min Variance: 1.06e-05  
p1=0.244, p2=0.225

--- Validation at iteration 1510 ---  
Average MSE: 240.6947, Average ANEES: 252.4215

-----  
--- Iter [1511/2000] ---  
Total Loss: 1354.0708  
MSE Component: 1.3454 (Weighted: 1345.4499)  
NLL Component: 8.5335  
Min Variance: 1.49e-05  
p1=0.244, p2=0.225  
--- Iter [1512/2000] ---  
Total Loss: 1248.0676  
MSE Component: 1.2425 (Weighted: 1242.4694)  
NLL Component: 5.5108  
Min Variance: 1.95e-05  
p1=0.244, p2=0.225  
--- Iter [1513/2000] ---  
Total Loss: 1264.6119  
MSE Component: 1.2582 (Weighted: 1258.1915)  
NLL Component: 6.3331  
Min Variance: 1.36e-05  
p1=0.244, p2=0.225  
--- Iter [1514/2000] ---  
Total Loss: 1823.5753  
MSE Component: 1.8190 (Weighted: 1818.9527)  
NLL Component: 4.5353  
Min Variance: 9.97e-06  
p1=0.244, p2=0.225  
--- Iter [1515/2000] ---  
Total Loss: 1745.3373  
MSE Component: 1.7390 (Weighted: 1739.0065)  
NLL Component: 6.2434  
Min Variance: 1.25e-05  
p1=0.244, p2=0.225  
--- Iter [1516/2000] ---  
Total Loss: 1590.0549  
MSE Component: 1.5845 (Weighted: 1584.4529)  
NLL Component: 5.5147  
Min Variance: 2.12e-05

p1=0.244, p2=0.225  
--- Iter [1517/2000] ---  
Total Loss: 1556.0004  
MSE Component: 1.5480 (Weighted: 1548.0002)  
NLL Component: 7.9127  
Min Variance: 1.57e-05  
p1=0.244, p2=0.225  
--- Iter [1518/2000] ---  
Total Loss: 1907.0839  
MSE Component: 1.9015 (Weighted: 1901.5090)  
NLL Component: 5.4874  
Min Variance: 1.66e-05  
p1=0.244, p2=0.225  
--- Iter [1519/2000] ---  
Total Loss: 1393.6884  
MSE Component: 1.3888 (Weighted: 1388.7728)  
NLL Component: 4.8281  
Min Variance: 1.13e-05  
p1=0.244, p2=0.225  
--- Iter [1520/2000] ---  
Total Loss: 1452.5463  
MSE Component: 1.4429 (Weighted: 1442.9214)  
NLL Component: 9.5375  
Min Variance: 9.64e-06  
p1=0.244, p2=0.225  
  
--- Validation at iteration 1520 ---  
Average MSE: 261.5811, Average ANEES: 259.8474

-----  
--- Iter [1521/2000] ---  
Total Loss: 1255.8975  
MSE Component: 1.2517 (Weighted: 1251.7364)  
NLL Component: 4.0736  
Min Variance: 1.32e-05  
p1=0.244, p2=0.225  
--- Iter [1522/2000] ---  
Total Loss: 1250.5796  
MSE Component: 1.2452 (Weighted: 1245.2393)  
NLL Component: 5.2529  
Min Variance: 2.98e-05  
p1=0.244, p2=0.225  
--- Iter [1523/2000] ---  
Total Loss: 1415.2506  
MSE Component: 1.4106 (Weighted: 1410.6406)  
NLL Component: 4.5226  
Min Variance: 2.15e-05  
p1=0.244, p2=0.225  
--- Iter [1524/2000] ---

```
Total Loss: 1490.8801
MSE Component: 1.4857 (Weighted: 1485.6974)
NLL Component: 5.0954
Min Variance: 6.44e-06
p1=0.244, p2=0.225
--- Iter [1525/2000] ---
Total Loss: 1361.0869
MSE Component: 1.3552 (Weighted: 1355.1910)
NLL Component: 5.8084
Min Variance: 5.58e-06
p1=0.244, p2=0.225
--- Iter [1526/2000] ---
Total Loss: 1239.4186
MSE Component: 1.2347 (Weighted: 1234.6580)
NLL Component: 4.6732
Min Variance: 1.69e-05
p1=0.244, p2=0.225
--- Iter [1527/2000] ---
Total Loss: 1563.5646
MSE Component: 1.5564 (Weighted: 1556.3983)
NLL Component: 7.0789
Min Variance: 1.19e-05
p1=0.244, p2=0.225
--- Iter [1528/2000] ---
Total Loss: 1464.5371
MSE Component: 1.4594 (Weighted: 1459.4270)
NLL Component: 5.0227
Min Variance: 7.37e-06
p1=0.244, p2=0.225
--- Iter [1529/2000] ---
Total Loss: 1481.9568
MSE Component: 1.4736 (Weighted: 1473.6246)
NLL Component: 8.2447
Min Variance: 3.58e-06
p1=0.244, p2=0.225
--- Iter [1530/2000] ---
Total Loss: 1279.3662
MSE Component: 1.2739 (Weighted: 1273.9340)
NLL Component: 5.3449
Min Variance: 8.81e-06
p1=0.244, p2=0.225

--- Validation at iteration 1530 ---
Average MSE: 269.8102, Average ANEES: 242.7757
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [1531/2000] ---
Total Loss: 1419.9894
```

MSE Component: 1.4151 (Weighted: 1415.0798)  
NLL Component: 4.8221  
Min Variance: 7.06e-06  
p1=0.244, p2=0.225  
--- Iter [1532/2000] ---  
Total Loss: 1257.8953  
MSE Component: 1.2512 (Weighted: 1251.1828)  
NLL Component: 6.6251  
Min Variance: 1.65e-05  
p1=0.244, p2=0.225  
--- Iter [1533/2000] ---  
Total Loss: 1509.3583  
MSE Component: 1.5016 (Weighted: 1501.6292)  
NLL Component: 7.6416  
Min Variance: 7.70e-06  
p1=0.244, p2=0.225  
--- Iter [1534/2000] ---  
Total Loss: 1518.4542  
MSE Component: 1.5120 (Weighted: 1511.9967)  
NLL Component: 6.3701  
Min Variance: 4.27e-06  
p1=0.244, p2=0.225  
--- Iter [1535/2000] ---  
Total Loss: 1509.6294  
MSE Component: 1.5030 (Weighted: 1502.9805)  
NLL Component: 6.5615  
Min Variance: 1.02e-05  
p1=0.244, p2=0.225  
--- Iter [1536/2000] ---  
Total Loss: 1463.4858  
MSE Component: 1.4584 (Weighted: 1458.4315)  
NLL Component: 4.9669  
Min Variance: 1.57e-05  
p1=0.244, p2=0.225  
--- Iter [1537/2000] ---  
Total Loss: 1828.1674  
MSE Component: 1.8221 (Weighted: 1822.0816)  
NLL Component: 5.9984  
Min Variance: 6.81e-06  
p1=0.244, p2=0.225  
--- Iter [1538/2000] ---  
Total Loss: 1500.9742  
MSE Component: 1.4953 (Weighted: 1495.2844)  
NLL Component: 5.6024  
Min Variance: 1.63e-05  
p1=0.244, p2=0.225  
--- Iter [1539/2000] ---  
Total Loss: 1302.5983

MSE Component: 1.2964 (Weighted: 1296.4296)  
NLL Component: 6.0812  
Min Variance: 1.38e-05  
p1=0.244, p2=0.225  
--- Iter [1540/2000] ---  
Total Loss: 1327.7512  
MSE Component: 1.3247 (Weighted: 1324.6980)  
NLL Component: 2.9659  
Min Variance: 1.92e-05  
p1=0.244, p2=0.225

--- Validation at iteration 1540 ---  
Average MSE: 245.2355, Average ANEES: 176.5827  
>>> New best VALIDATION ANEES! Saving model. <<<

-----

--- Iter [1541/2000] ---  
Total Loss: 1703.6460  
MSE Component: 1.6975 (Weighted: 1697.5292)  
NLL Component: 6.0295  
Min Variance: 1.87e-05  
p1=0.244, p2=0.225  
--- Iter [1542/2000] ---  
Total Loss: 1563.6740  
MSE Component: 1.5565 (Weighted: 1556.5355)  
NLL Component: 7.0510  
Min Variance: 1.65e-05  
p1=0.244, p2=0.225  
--- Iter [1543/2000] ---  
Total Loss: 1864.9492  
MSE Component: 1.8600 (Weighted: 1860.0384)  
NLL Component: 4.8234  
Min Variance: 1.13e-05  
p1=0.244, p2=0.225  
--- Iter [1544/2000] ---  
Total Loss: 1873.5955  
MSE Component: 1.8650 (Weighted: 1865.0403)  
NLL Component: 8.4678  
Min Variance: 8.64e-06  
p1=0.244, p2=0.225  
--- Iter [1545/2000] ---  
Total Loss: 1729.7518  
MSE Component: 1.7250 (Weighted: 1724.9628)  
NLL Component: 4.7015  
Min Variance: 1.26e-05  
p1=0.244, p2=0.225  
--- Iter [1546/2000] ---  
Total Loss: 1488.6211  
MSE Component: 1.4834 (Weighted: 1483.3852)

```

NLL Component: 5.1484
Min Variance: 1.77e-05
p1=0.244, p2=0.225
--- Iter [1547/2000] ---
Total Loss: 1431.5358
MSE Component: 1.4258 (Weighted: 1425.7656)
NLL Component: 5.6827
Min Variance: 1.64e-05
p1=0.243, p2=0.225
--- Iter [1548/2000] ---
Total Loss: 1867.4222
MSE Component: 1.8620 (Weighted: 1862.0243)
NLL Component: 5.3106
Min Variance: 1.39e-05
p1=0.243, p2=0.225
--- Iter [1549/2000] ---
Total Loss: 1251.3105
MSE Component: 1.2455 (Weighted: 1245.5078)
NLL Component: 5.7153
Min Variance: 9.24e-06
p1=0.243, p2=0.225
--- Iter [1550/2000] ---
Total Loss: 1375.2910
MSE Component: 1.3692 (Weighted: 1369.1610)
NLL Component: 6.0426
Min Variance: 6.15e-06
p1=0.243, p2=0.225

--- Validation at iteration 1550 ---
Average MSE: 263.9750, Average ANEES: 280.8377
-----
--- Iter [1551/2000] ---
Total Loss: 1557.0155
MSE Component: 1.5529 (Weighted: 1552.9433)
NLL Component: 3.9848
Min Variance: 1.01e-05
p1=0.243, p2=0.225
--- Iter [1552/2000] ---
Total Loss: 1577.4918
MSE Component: 1.5722 (Weighted: 1572.2401)
NLL Component: 5.1643
Min Variance: 1.87e-05
p1=0.243, p2=0.225
--- Iter [1553/2000] ---
Total Loss: 1420.6619
MSE Component: 1.4160 (Weighted: 1416.0188)
NLL Component: 4.5556
Min Variance: 1.56e-05

```

```

p1=0.243, p2=0.225
--- Iter [1554/2000] ---
Total Loss: 2219.5225
MSE Component: 2.2104 (Weighted: 2210.3837)
NLL Component: 9.0515
Min Variance: 2.81e-05
p1=0.243, p2=0.225
--- Iter [1555/2000] ---
Total Loss: 1343.1184
MSE Component: 1.3369 (Weighted: 1336.9212)
NLL Component: 6.1098
Min Variance: 1.88e-05
p1=0.243, p2=0.225
--- Iter [1556/2000] ---
Total Loss: 1240.0999
MSE Component: 1.2345 (Weighted: 1234.4724)
NLL Component: 5.5401
Min Variance: 1.49e-05
p1=0.243, p2=0.225
--- Iter [1557/2000] ---
Total Loss: 1103.8743
MSE Component: 1.0989 (Weighted: 1098.9107)
NLL Component: 4.8762
Min Variance: 1.33e-05
p1=0.243, p2=0.225
--- Iter [1558/2000] ---
Total Loss: 1653.8882
MSE Component: 1.6476 (Weighted: 1647.5861)
NLL Component: 6.2147
Min Variance: 1.37e-05
p1=0.243, p2=0.225
--- Iter [1559/2000] ---
Total Loss: 1339.9979
MSE Component: 1.3355 (Weighted: 1335.4651)
NLL Component: 4.4454
Min Variance: 1.17e-05
p1=0.243, p2=0.225
--- Iter [1560/2000] ---
Total Loss: 1575.8345
MSE Component: 1.5701 (Weighted: 1570.1027)
NLL Component: 5.6444
Min Variance: 1.24e-05
p1=0.243, p2=0.225

--- Validation at iteration 1560 ---
Average MSE: 266.9626, Average ANEES: 159.0655
>>> New best VALIDATION ANEES! Saving model. <<<
-----
```

```
--- Iter [1561/2000] ---
Total Loss: 1260.0804
MSE Component: 1.2552 (Weighted: 1255.1905)
NLL Component: 4.8025
Min Variance: 1.71e-05
p1=0.243, p2=0.225
--- Iter [1562/2000] ---
Total Loss: 1306.0457
MSE Component: 1.3014 (Weighted: 1301.3883)
NLL Component: 4.5699
Min Variance: 1.80e-05
p1=0.243, p2=0.225
--- Iter [1563/2000] ---
Total Loss: 1181.8582
MSE Component: 1.1750 (Weighted: 1175.0253)
NLL Component: 6.7454
Min Variance: 1.55e-05
p1=0.243, p2=0.225
--- Iter [1564/2000] ---
Total Loss: 1186.8618
MSE Component: 1.1810 (Weighted: 1181.0493)
NLL Component: 5.7251
Min Variance: 2.69e-05
p1=0.243, p2=0.225
--- Iter [1565/2000] ---
Total Loss: 1456.2427
MSE Component: 1.4514 (Weighted: 1451.4492)
NLL Component: 4.7062
Min Variance: 1.76e-05
p1=0.243, p2=0.225
--- Iter [1566/2000] ---
Total Loss: 805.2446
MSE Component: 0.8015 (Weighted: 801.4974)
NLL Component: 3.6599
Min Variance: 2.17e-05
p1=0.243, p2=0.225
--- Iter [1567/2000] ---
Total Loss: 1703.2646
MSE Component: 1.6950 (Weighted: 1695.0322)
NLL Component: 8.1451
Min Variance: 1.37e-05
p1=0.243, p2=0.225
--- Iter [1568/2000] ---
Total Loss: 1412.8358
MSE Component: 1.4067 (Weighted: 1406.7199)
NLL Component: 6.0284
Min Variance: 9.63e-06
p1=0.243, p2=0.225
```

```
--- Iter [1569/2000] ---
Total Loss: 1321.4758
MSE Component: 1.3160 (Weighted: 1316.0172)
NLL Component: 5.3713
Min Variance: 1.53e-05
p1=0.243, p2=0.225
--- Iter [1570/2000] ---
Total Loss: 1179.9159
MSE Component: 1.1743 (Weighted: 1174.3047)
NLL Component: 5.5239
Min Variance: 1.14e-05
p1=0.243, p2=0.225

--- Validation at iteration 1570 ---
Average MSE: 278.1866, Average ANEES: 175.4873
-----
--- Iter [1571/2000] ---
Total Loss: 1104.1768
MSE Component: 1.1006 (Weighted: 1100.6457)
NLL Component: 3.4437
Min Variance: 1.61e-05
p1=0.243, p2=0.225
--- Iter [1572/2000] ---
Total Loss: 1110.7345
MSE Component: 1.1068 (Weighted: 1106.8192)
NLL Component: 3.8280
Min Variance: 2.11e-05
p1=0.243, p2=0.225
--- Iter [1573/2000] ---
Total Loss: 1240.5212
MSE Component: 1.2339 (Weighted: 1233.8903)
NLL Component: 6.5437
Min Variance: 2.45e-05
p1=0.243, p2=0.225
--- Iter [1574/2000] ---
Total Loss: 1145.7749
MSE Component: 1.1404 (Weighted: 1140.4080)
NLL Component: 5.2795
Min Variance: 1.97e-05
p1=0.243, p2=0.225
--- Iter [1575/2000] ---
Total Loss: 1353.2736
MSE Component: 1.3490 (Weighted: 1349.0005)
NLL Component: 4.1858
Min Variance: 1.52e-05
p1=0.243, p2=0.225
--- Iter [1576/2000] ---
Total Loss: 1029.4014
```

MSE Component: 1.0243 (Weighted: 1024.3077)  
NLL Component: 5.0064  
Min Variance: 1.56e-05  
p1=0.243, p2=0.225  
--- Iter [1577/2000] ---  
Total Loss: 1368.1619  
MSE Component: 1.3626 (Weighted: 1362.5579)  
NLL Component: 5.5167  
Min Variance: 4.03e-06  
p1=0.243, p2=0.225  
--- Iter [1578/2000] ---  
Total Loss: 1501.8473  
MSE Component: 1.4982 (Weighted: 1498.1799)  
NLL Component: 3.5801  
Min Variance: 1.27e-05  
p1=0.243, p2=0.225  
--- Iter [1579/2000] ---  
Total Loss: 1513.7808  
MSE Component: 1.5096 (Weighted: 1509.5638)  
NLL Component: 4.1297  
Min Variance: 2.33e-05  
p1=0.243, p2=0.225  
--- Iter [1580/2000] ---  
Total Loss: 1196.3394  
MSE Component: 1.1923 (Weighted: 1192.2572)  
NLL Component: 3.9948  
Min Variance: 1.03e-05  
p1=0.243, p2=0.225

--- Validation at iteration 1580 ---  
Average MSE: 245.4361, Average ANEES: 228.6146

-----

--- Iter [1581/2000] ---  
Total Loss: 1197.8234  
MSE Component: 1.1909 (Weighted: 1190.8770)  
NLL Component: 6.8591  
Min Variance: 1.26e-05  
p1=0.243, p2=0.225  
--- Iter [1582/2000] ---  
Total Loss: 1325.6688  
MSE Component: 1.3210 (Weighted: 1320.9829)  
NLL Component: 4.5987  
Min Variance: 1.10e-05  
p1=0.243, p2=0.225  
--- Iter [1583/2000] ---  
Total Loss: 1143.8966  
MSE Component: 1.1381 (Weighted: 1138.1052)  
NLL Component: 5.7042

```

Min Variance: 7.96e-06
p1=0.243, p2=0.225
--- Iter [1584/2000] ---
Total Loss: 1281.2078
MSE Component: 1.2761 (Weighted: 1276.1254)
NLL Component: 4.9950
Min Variance: 5.09e-05
p1=0.243, p2=0.225
--- Iter [1585/2000] ---
Total Loss: 1158.2686
MSE Component: 1.1526 (Weighted: 1152.6303)
NLL Component: 5.5509
Min Variance: 1.38e-05
p1=0.243, p2=0.225
--- Iter [1586/2000] ---
Total Loss: 1397.1791
MSE Component: 1.3921 (Weighted: 1392.0920)
NLL Component: 4.9997
Min Variance: 2.59e-05
p1=0.243, p2=0.225
--- Iter [1587/2000] ---
Total Loss: 1351.2198
MSE Component: 1.3466 (Weighted: 1346.6421)
NLL Component: 4.4905
Min Variance: 1.36e-05
p1=0.243, p2=0.224
--- Iter [1588/2000] ---
Total Loss: 1517.7405
MSE Component: 1.5128 (Weighted: 1512.7819)
NLL Component: 4.8714
Min Variance: 4.52e-06
p1=0.243, p2=0.224
--- Iter [1589/2000] ---
Total Loss: 1148.4484
MSE Component: 1.1431 (Weighted: 1143.1310)
NLL Component: 5.2301
Min Variance: 1.17e-05
p1=0.243, p2=0.224
--- Iter [1590/2000] ---
Total Loss: 1063.3912
MSE Component: 1.0587 (Weighted: 1058.6727)
NLL Component: 4.6313
Min Variance: 1.11e-05
p1=0.243, p2=0.224

--- Validation at iteration 1590 ---
Average MSE: 297.1681, Average ANEES: 182.8912
-----
```

```
--- Iter [1591/2000] ---
Total Loss: 914.3772
MSE Component: 0.9099 (Weighted: 909.8679)
NLL Component: 4.4220
Min Variance: 9.91e-06
p1=0.243, p2=0.224
--- Iter [1592/2000] ---
Total Loss: 1026.4343
MSE Component: 1.0216 (Weighted: 1021.6305)
NLL Component: 4.7165
Min Variance: 8.82e-06
p1=0.243, p2=0.224
--- Iter [1593/2000] ---
Total Loss: 1360.7616
MSE Component: 1.3552 (Weighted: 1355.2405)
NLL Component: 5.4339
Min Variance: 1.39e-05
p1=0.243, p2=0.224
--- Iter [1594/2000] ---
Total Loss: 1276.8400
MSE Component: 1.2711 (Weighted: 1271.0730)
NLL Component: 5.6796
Min Variance: 4.47e-06
p1=0.243, p2=0.224
--- Iter [1595/2000] ---
Total Loss: 1261.2998
MSE Component: 1.2547 (Weighted: 1254.6763)
NLL Component: 6.5361
Min Variance: 1.36e-05
p1=0.243, p2=0.224
--- Iter [1596/2000] ---
Total Loss: 1263.2783
MSE Component: 1.2586 (Weighted: 1258.5576)
NLL Component: 4.6334
Min Variance: 1.22e-05
p1=0.243, p2=0.224
--- Iter [1597/2000] ---
Total Loss: 1183.7101
MSE Component: 1.1786 (Weighted: 1178.5508)
NLL Component: 5.0720
Min Variance: 2.77e-05
p1=0.243, p2=0.224
--- Iter [1598/2000] ---
Total Loss: 1264.3792
MSE Component: 1.2591 (Weighted: 1259.0724)
NLL Component: 5.2195
Min Variance: 1.96e-05
p1=0.243, p2=0.224
```

```
--- Iter [1599/2000] ---
Total Loss: 1274.0011
MSE Component: 1.2704 (Weighted: 1270.3867)
NLL Component: 3.5271
Min Variance: 4.32e-06
p1=0.243, p2=0.224
--- Iter [1600/2000] ---
Total Loss: 1049.0203
MSE Component: 1.0438 (Weighted: 1043.8313)
NLL Component: 5.1017
Min Variance: 1.76e-05
p1=0.243, p2=0.224

--- Validation at iteration 1600 ---
Average MSE: 305.7114, Average ANEES: 168.4139
-----
--- Iter [1601/2000] ---
Total Loss: 1217.6373
MSE Component: 1.2136 (Weighted: 1213.5729)
NLL Component: 3.9772
Min Variance: 1.73e-05
p1=0.243, p2=0.224
--- Iter [1602/2000] ---
Total Loss: 1815.3472
MSE Component: 1.8073 (Weighted: 1807.2938)
NLL Component: 7.9661
Min Variance: 1.98e-05
p1=0.243, p2=0.224
--- Iter [1603/2000] ---
Total Loss: 1474.0120
MSE Component: 1.4691 (Weighted: 1469.0907)
NLL Component: 4.8340
Min Variance: 1.76e-05
p1=0.243, p2=0.224
--- Iter [1604/2000] ---
Total Loss: 1163.2074
MSE Component: 1.1580 (Weighted: 1157.9683)
NLL Component: 5.1518
Min Variance: 1.53e-05
p1=0.243, p2=0.224
--- Iter [1605/2000] ---
Total Loss: 1266.4203
MSE Component: 1.2610 (Weighted: 1261.0493)
NLL Component: 5.2837
Min Variance: 4.64e-06
p1=0.243, p2=0.224
--- Iter [1606/2000] ---
Total Loss: 1344.6975
```

MSE Component: 1.3397 (Weighted: 1339.7034)  
NLL Component: 4.9068  
Min Variance: 7.60e-06  
p1=0.242, p2=0.224  
--- Iter [1607/2000] ---  
Total Loss: 1274.2262  
MSE Component: 1.2693 (Weighted: 1269.2816)  
NLL Component: 4.8573  
Min Variance: 1.69e-05  
p1=0.242, p2=0.224  
--- Iter [1608/2000] ---  
Total Loss: 1433.9929  
MSE Component: 1.4280 (Weighted: 1428.0313)  
NLL Component: 5.8742  
Min Variance: 2.97e-05  
p1=0.242, p2=0.224  
--- Iter [1609/2000] ---  
Total Loss: 1290.2699  
MSE Component: 1.2848 (Weighted: 1284.7615)  
NLL Component: 5.4210  
Min Variance: 6.48e-06  
p1=0.242, p2=0.224  
--- Iter [1610/2000] ---  
Total Loss: 1312.1471  
MSE Component: 1.3065 (Weighted: 1306.4923)  
NLL Component: 5.5675  
Min Variance: 2.05e-05  
p1=0.242, p2=0.224

--- Validation at iteration 1610 ---  
Average MSE: 261.5791, Average ANEES: 178.9387

-----

--- Iter [1611/2000] ---  
Total Loss: 1107.4885  
MSE Component: 1.1028 (Weighted: 1102.7786)  
NLL Component: 4.6227  
Min Variance: 7.78e-06  
p1=0.242, p2=0.224  
--- Iter [1612/2000] ---  
Total Loss: 1373.0215  
MSE Component: 1.3691 (Weighted: 1369.0568)  
NLL Component: 3.8774  
Min Variance: 9.25e-06  
p1=0.242, p2=0.224  
--- Iter [1613/2000] ---  
Total Loss: 1232.9126  
MSE Component: 1.2249 (Weighted: 1224.9217)  
NLL Component: 7.9035

```

Min Variance: 9.44e-06
p1=0.242, p2=0.224
--- Iter [1614/2000] ---
Total Loss: 1092.4628
MSE Component: 1.0870 (Weighted: 1086.9683)
NLL Component: 5.4072
Min Variance: 1.41e-05
p1=0.242, p2=0.224
--- Iter [1615/2000] ---
Total Loss: 1509.2126
MSE Component: 1.5025 (Weighted: 1502.5067)
NLL Component: 6.6186
Min Variance: 1.14e-05
p1=0.242, p2=0.224
--- Iter [1616/2000] ---
Total Loss: 1330.0918
MSE Component: 1.3257 (Weighted: 1325.7298)
NLL Component: 4.2746
Min Variance: 2.39e-05
p1=0.242, p2=0.224
--- Iter [1617/2000] ---
Total Loss: 1111.7488
MSE Component: 1.1067 (Weighted: 1106.7410)
NLL Component: 4.9205
Min Variance: 7.03e-06
p1=0.242, p2=0.224
--- Iter [1618/2000] ---
Total Loss: 1385.7858
MSE Component: 1.3816 (Weighted: 1381.5588)
NLL Component: 4.1397
Min Variance: 1.56e-05
p1=0.242, p2=0.224
--- Iter [1619/2000] ---
Total Loss: 975.6407
MSE Component: 0.9718 (Weighted: 971.7934)
NLL Component: 3.7601
Min Variance: 7.92e-06
p1=0.242, p2=0.224
--- Iter [1620/2000] ---
Total Loss: 1012.7784
MSE Component: 1.0086 (Weighted: 1008.5775)
NLL Component: 4.1137
Min Variance: 1.23e-05
p1=0.242, p2=0.224

--- Validation at iteration 1620 ---
Average MSE: 284.1614, Average ANEES: 118.1949
>>> New best VALIDATION ANEES! Saving model. <<<

```

```
-----  
--- Iter [1621/2000] ---  
    Total Loss: 1156.4335  
    MSE Component: 1.1535 (Weighted: 1153.4936)  
    NLL Component: 2.8525  
    Min Variance: 2.37e-05  
    p1=0.242, p2=0.224  
--- Iter [1622/2000] ---  
    Total Loss: 1250.9767  
    MSE Component: 1.2453 (Weighted: 1245.3226)  
    NLL Component: 5.5667  
    Min Variance: 1.67e-05  
    p1=0.242, p2=0.224  
--- Iter [1623/2000] ---  
    Total Loss: 1610.6943  
    MSE Component: 1.6037 (Weighted: 1603.6503)  
    NLL Component: 6.9567  
    Min Variance: 1.18e-05  
    p1=0.242, p2=0.224  
--- Iter [1624/2000] ---  
    Total Loss: 1441.2993  
    MSE Component: 1.4365 (Weighted: 1436.5358)  
    NLL Component: 4.6761  
    Min Variance: 1.95e-05  
    p1=0.242, p2=0.224  
--- Iter [1625/2000] ---  
    Total Loss: 1228.6099  
    MSE Component: 1.2234 (Weighted: 1223.4275)  
    NLL Component: 5.0950  
    Min Variance: 9.04e-06  
    p1=0.242, p2=0.224  
--- Iter [1626/2000] ---  
    Total Loss: 967.0707  
    MSE Component: 0.9632 (Weighted: 963.2201)  
    NLL Component: 3.7634  
    Min Variance: 7.19e-06  
    p1=0.242, p2=0.224  
--- Iter [1627/2000] ---  
    Total Loss: 1147.2351  
    MSE Component: 1.1417 (Weighted: 1141.6662)  
    NLL Component: 5.4817  
    Min Variance: 1.43e-05  
    p1=0.242, p2=0.224  
--- Iter [1628/2000] ---  
    Total Loss: 985.0924  
    MSE Component: 0.9805 (Weighted: 980.4921)  
    NLL Component: 4.5131  
    Min Variance: 1.97e-05
```

```
p1=0.242, p2=0.224
--- Iter [1629/2000] ---
Total Loss: 1249.6687
MSE Component: 1.2451 (Weighted: 1245.0912)
NLL Component: 4.4903
Min Variance: 1.08e-05
p1=0.242, p2=0.224
--- Iter [1630/2000] ---
Total Loss: 1205.0385
MSE Component: 1.2003 (Weighted: 1200.2978)
NLL Component: 4.6533
Min Variance: 4.75e-06
p1=0.242, p2=0.224

--- Validation at iteration 1630 ---
Average MSE: 293.5550, Average ANEES: 144.9432
-----
--- Iter [1631/2000] ---
Total Loss: 1117.7350
MSE Component: 1.1137 (Weighted: 1113.6873)
NLL Component: 3.9605
Min Variance: 8.84e-06
p1=0.242, p2=0.224
--- Iter [1632/2000] ---
Total Loss: 1020.1216
MSE Component: 1.0141 (Weighted: 1014.0772)
NLL Component: 5.9572
Min Variance: 2.48e-05
p1=0.242, p2=0.224
--- Iter [1633/2000] ---
Total Loss: 976.5425
MSE Component: 0.9728 (Weighted: 972.7666)
NLL Component: 3.6886
Min Variance: 8.04e-06
p1=0.242, p2=0.224
--- Iter [1634/2000] ---
Total Loss: 1405.6476
MSE Component: 1.4010 (Weighted: 1401.0265)
NLL Component: 4.5338
Min Variance: 3.64e-05
p1=0.242, p2=0.224
--- Iter [1635/2000] ---
Total Loss: 1174.2002
MSE Component: 1.1690 (Weighted: 1169.0285)
NLL Component: 5.0844
Min Variance: 9.91e-06
p1=0.242, p2=0.224
--- Iter [1636/2000] ---
```

```

Total Loss: 1117.2113
MSE Component: 1.1126 (Weighted: 1112.6250)
NLL Component: 4.4990
Min Variance: 2.41e-05
p1=0.242, p2=0.224
--- Iter [1637/2000] ---
Total Loss: 1292.3446
MSE Component: 1.2856 (Weighted: 1285.5947)
NLL Component: 6.6626
Min Variance: 9.72e-06
p1=0.242, p2=0.224
--- Iter [1638/2000] ---
Total Loss: 1382.1038
MSE Component: 1.3777 (Weighted: 1377.6553)
NLL Component: 4.3612
Min Variance: 2.72e-05
p1=0.242, p2=0.224
--- Iter [1639/2000] ---
Total Loss: 1187.7996
MSE Component: 1.1811 (Weighted: 1181.1090)
NLL Component: 6.6033
Min Variance: 1.84e-05
p1=0.242, p2=0.224
--- Iter [1640/2000] ---
Total Loss: 951.3075
MSE Component: 0.9473 (Weighted: 947.2710)
NLL Component: 3.9491
Min Variance: 1.09e-05
p1=0.242, p2=0.224

--- Validation at iteration 1640 ---
Average MSE: 287.3184, Average ANEES: 181.5522
-----
--- Iter [1641/2000] ---
Total Loss: 1352.1276
MSE Component: 1.3495 (Weighted: 1349.5371)
NLL Component: 2.5032
Min Variance: 1.20e-05
p1=0.242, p2=0.224
--- Iter [1642/2000] ---
Total Loss: 1896.3193
MSE Component: 1.8914 (Weighted: 1891.4156)
NLL Component: 4.8164
Min Variance: 1.42e-05
p1=0.242, p2=0.224
--- Iter [1643/2000] ---
Total Loss: 1796.7618
MSE Component: 1.7908 (Weighted: 1790.8322)

```

```

NLL Component: 5.8424
Min Variance: 1.99e-05
p1=0.242, p2=0.224
--- Iter [1644/2000] ---
Total Loss: 1602.2382
MSE Component: 1.5964 (Weighted: 1596.3535)
NLL Component: 5.7974
Min Variance: 1.60e-05
p1=0.242, p2=0.224
--- Iter [1645/2000] ---
Total Loss: 1219.8905
MSE Component: 1.2152 (Weighted: 1215.1555)
NLL Component: 4.6478
Min Variance: 6.67e-06
p1=0.242, p2=0.224
--- Iter [1646/2000] ---
Total Loss: 1515.2572
MSE Component: 1.5103 (Weighted: 1510.2766)
NLL Component: 4.8933
Min Variance: 9.40e-06
p1=0.242, p2=0.224
--- Iter [1647/2000] ---
Total Loss: 1949.2749
MSE Component: 1.9441 (Weighted: 1944.1047)
NLL Component: 5.0830
Min Variance: 9.74e-06
p1=0.242, p2=0.224
--- Iter [1648/2000] ---
Total Loss: 1842.2605
MSE Component: 1.8370 (Weighted: 1836.9550)
NLL Component: 5.2182
Min Variance: 7.98e-06
p1=0.242, p2=0.224
--- Iter [1649/2000] ---
Total Loss: 1733.2308
MSE Component: 1.7287 (Weighted: 1728.7004)
NLL Component: 4.4431
Min Variance: 1.44e-05
p1=0.242, p2=0.224
--- Iter [1650/2000] ---
Total Loss: 1317.1412
MSE Component: 1.3125 (Weighted: 1312.5249)
NLL Component: 4.5291
Min Variance: 4.56e-06
p1=0.242, p2=0.224

--- Validation at iteration 1650 ---
Average MSE: 259.9225, Average ANEES: 162.5930

```

```
-----  
--- Iter [1651/2000] ---  
    Total Loss: 1737.5626  
    MSE Component: 1.7325 (Weighted: 1732.5144)  
    NLL Component: 4.9609  
    Min Variance: 9.47e-06  
    p1=0.242, p2=0.224  
--- Iter [1652/2000] ---  
    Total Loss: 2312.3760  
    MSE Component: 2.3062 (Weighted: 2306.2277)  
    NLL Component: 6.0608  
    Min Variance: 6.69e-06  
    p1=0.242, p2=0.224  
--- Iter [1653/2000] ---  
    Total Loss: 1687.5991  
    MSE Component: 1.6820 (Weighted: 1682.0309)  
    NLL Component: 5.4810  
    Min Variance: 1.82e-05  
    p1=0.242, p2=0.224  
--- Iter [1654/2000] ---  
    Total Loss: 1757.0491  
    MSE Component: 1.7507 (Weighted: 1750.6884)  
    NLL Component: 6.2733  
    Min Variance: 7.71e-06  
    p1=0.242, p2=0.224  
--- Iter [1655/2000] ---  
    Total Loss: 1896.1605  
    MSE Component: 1.8913 (Weighted: 1891.2594)  
    NLL Component: 4.8139  
    Min Variance: 1.40e-05  
    p1=0.242, p2=0.224  
--- Iter [1656/2000] ---  
    Total Loss: 1505.0519  
    MSE Component: 1.5020 (Weighted: 1501.9966)  
    NLL Component: 2.9681  
    Min Variance: 2.08e-05  
    p1=0.242, p2=0.224  
--- Iter [1657/2000] ---  
    Total Loss: 1426.0217  
    MSE Component: 1.4214 (Weighted: 1421.3692)  
    NLL Component: 4.5654  
    Min Variance: 1.25e-05  
    p1=0.242, p2=0.224  
--- Iter [1658/2000] ---  
    Total Loss: 1628.4602  
    MSE Component: 1.6225 (Weighted: 1622.5033)  
    NLL Component: 5.8696  
    Min Variance: 1.69e-05
```

```

p1=0.242, p2=0.224
--- Iter [1659/2000] ---
Total Loss: 1696.9757
MSE Component: 1.6933 (Weighted: 1693.3020)
NLL Component: 3.5865
Min Variance: 2.17e-05
p1=0.242, p2=0.224
--- Iter [1660/2000] ---
Total Loss: 1918.0582
MSE Component: 1.9129 (Weighted: 1912.9471)
NLL Component: 5.0239
Min Variance: 2.53e-06
p1=0.242, p2=0.224

--- Validation at iteration 1660 ---
Average MSE: 404.2839, Average ANEES: 94.9424
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [1661/2000] ---
Total Loss: 1491.6804
MSE Component: 1.4880 (Weighted: 1488.0178)
NLL Component: 3.5753
Min Variance: 2.89e-06
p1=0.242, p2=0.224
--- Iter [1662/2000] ---
Total Loss: 1233.2820
MSE Component: 1.2294 (Weighted: 1229.4488)
NLL Component: 3.7459
Min Variance: 1.02e-05
p1=0.242, p2=0.224
--- Iter [1663/2000] ---
Total Loss: 1219.2926
MSE Component: 1.2147 (Weighted: 1214.6868)
NLL Component: 4.5186
Min Variance: 1.38e-05
p1=0.242, p2=0.224
--- Iter [1664/2000] ---
Total Loss: 1206.8691
MSE Component: 1.2027 (Weighted: 1202.7200)
NLL Component: 4.0618
Min Variance: 1.31e-05
p1=0.242, p2=0.224
--- Iter [1665/2000] ---
Total Loss: 1286.8661
MSE Component: 1.2826 (Weighted: 1282.6090)
NLL Component: 4.1698
Min Variance: 1.16e-05
p1=0.242, p2=0.224

```

```

--- Iter [1666/2000] ---
Total Loss: 1268.0198
MSE Component: 1.2624 (Weighted: 1262.3723)
NLL Component: 5.5602
Min Variance: 1.46e-05
p1=0.242, p2=0.224
--- Iter [1667/2000] ---
Total Loss: 1188.9821
MSE Component: 1.1837 (Weighted: 1183.6754)
NLL Component: 5.2193
Min Variance: 1.21e-05
p1=0.242, p2=0.224
--- Iter [1668/2000] ---
Total Loss: 1451.0034
MSE Component: 1.4476 (Weighted: 1447.5852)
NLL Component: 3.3309
Min Variance: 2.74e-05
p1=0.242, p2=0.224
--- Iter [1669/2000] ---
Total Loss: 980.2784
MSE Component: 0.9751 (Weighted: 975.1434)
NLL Component: 5.0477
Min Variance: 1.45e-05
p1=0.242, p2=0.224
--- Iter [1670/2000] ---
Total Loss: 1478.8308
MSE Component: 1.4736 (Weighted: 1473.6409)
NLL Component: 5.1026
Min Variance: 2.54e-05
p1=0.242, p2=0.224

--- Validation at iteration 1670 ---
Average MSE: 319.6726, Average ANEES: 173.3237
-----
--- Iter [1671/2000] ---
Total Loss: 1109.3048
MSE Component: 1.1059 (Weighted: 1105.9227)
NLL Component: 3.2948
Min Variance: 1.78e-05
p1=0.242, p2=0.224
--- Iter [1672/2000] ---
Total Loss: 1400.5599
MSE Component: 1.3963 (Weighted: 1396.3267)
NLL Component: 4.1460
Min Variance: 1.57e-06
p1=0.242, p2=0.224
--- Iter [1673/2000] ---
Total Loss: 1246.9562

```

MSE Component: 1.2420 (Weighted: 1241.9631)  
NLL Component: 4.9057  
Min Variance: 1.15e-05  
p1=0.242, p2=0.224  
--- Iter [1674/2000] ---  
Total Loss: 1446.6233  
MSE Component: 1.4427 (Weighted: 1442.6935)  
NLL Component: 3.8426  
Min Variance: 2.67e-05  
p1=0.242, p2=0.224  
--- Iter [1675/2000] ---  
Total Loss: 1193.9713  
MSE Component: 1.1892 (Weighted: 1189.1884)  
NLL Component: 4.6957  
Min Variance: 1.78e-05  
p1=0.242, p2=0.224  
--- Iter [1676/2000] ---  
Total Loss: 1296.1389  
MSE Component: 1.2913 (Weighted: 1291.3303)  
NLL Component: 4.7213  
Min Variance: 1.48e-05  
p1=0.242, p2=0.224  
--- Iter [1677/2000] ---  
Total Loss: 1269.2844  
MSE Component: 1.2644 (Weighted: 1264.4340)  
NLL Component: 4.7632  
Min Variance: 1.49e-05  
p1=0.242, p2=0.224  
--- Iter [1678/2000] ---  
Total Loss: 986.3071  
MSE Component: 0.9834 (Weighted: 983.4147)  
NLL Component: 2.8051  
Min Variance: 2.36e-05  
p1=0.242, p2=0.224  
--- Iter [1679/2000] ---  
Total Loss: 1474.2356  
MSE Component: 1.4693 (Weighted: 1469.2872)  
NLL Component: 4.8612  
Min Variance: 5.19e-06  
p1=0.242, p2=0.224  
--- Iter [1680/2000] ---  
Total Loss: 1390.1173  
MSE Component: 1.3857 (Weighted: 1385.7003)  
NLL Component: 4.3297  
Min Variance: 4.97e-06  
p1=0.242, p2=0.224  
  
--- Validation at iteration 1680 ---

Average MSE: 317.7183, Average ANEES: 100.7641

---

--- Iter [1681/2000] ---  
Total Loss: 1326.3187  
MSE Component: 1.3198 (Weighted: 1319.7601)  
NLL Component: 6.4714  
Min Variance: 8.55e-06  
p1=0.242, p2=0.224  
--- Iter [1682/2000] ---  
Total Loss: 1487.7062  
MSE Component: 1.4831 (Weighted: 1483.1214)  
NLL Component: 4.4976  
Min Variance: 2.17e-05  
p1=0.242, p2=0.224  
--- Iter [1683/2000] ---  
Total Loss: 1496.0703  
MSE Component: 1.4916 (Weighted: 1491.5802)  
NLL Component: 4.4028  
Min Variance: 7.67e-06  
p1=0.242, p2=0.224  
--- Iter [1684/2000] ---  
Total Loss: 1064.5706  
MSE Component: 1.0601 (Weighted: 1060.1193)  
NLL Component: 4.3641  
Min Variance: 2.86e-06  
p1=0.242, p2=0.224  
--- Iter [1685/2000] ---  
Total Loss: 1575.5704  
MSE Component: 1.5719 (Weighted: 1571.9051)  
NLL Component: 3.5780  
Min Variance: 2.96e-05  
p1=0.242, p2=0.224  
--- Iter [1686/2000] ---  
Total Loss: 1023.8275  
MSE Component: 1.0192 (Weighted: 1019.1543)  
NLL Component: 4.5859  
Min Variance: 1.08e-05  
p1=0.242, p2=0.224  
--- Iter [1687/2000] ---  
Total Loss: 1138.8187  
MSE Component: 1.1345 (Weighted: 1134.4504)  
NLL Component: 4.2810  
Min Variance: 1.45e-05  
p1=0.242, p2=0.224  
--- Iter [1688/2000] ---  
Total Loss: 1431.9487  
MSE Component: 1.4263 (Weighted: 1426.3240)  
NLL Component: 5.5375

```

Min Variance: 8.80e-06
p1=0.242, p2=0.224
--- Iter [1689/2000] ---
Total Loss: 1089.5819
MSE Component: 1.0864 (Weighted: 1086.3870)
NLL Component: 3.1076
Min Variance: 2.32e-05
p1=0.241, p2=0.224
--- Iter [1690/2000] ---
Total Loss: 1489.4224
MSE Component: 1.4860 (Weighted: 1486.0387)
NLL Component: 3.2963
Min Variance: 1.00e-06
p1=0.241, p2=0.224

--- Validation at iteration 1690 ---
Average MSE: 302.1770, Average ANEES: 148.9598
-----
--- Iter [1691/2000] ---
Total Loss: 1951.6315
MSE Component: 1.9468 (Weighted: 1946.7831)
NLL Component: 4.7611
Min Variance: 1.65e-05
p1=0.241, p2=0.224
--- Iter [1692/2000] ---
Total Loss: 1035.2267
MSE Component: 1.0289 (Weighted: 1028.9267)
NLL Component: 6.2127
Min Variance: 3.63e-06
p1=0.241, p2=0.224
--- Iter [1693/2000] ---
Total Loss: 1159.9225
MSE Component: 1.1558 (Weighted: 1155.8415)
NLL Component: 3.9938
Min Variance: 1.69e-05
p1=0.241, p2=0.224
--- Iter [1694/2000] ---
Total Loss: 1077.2482
MSE Component: 1.0740 (Weighted: 1073.9783)
NLL Component: 3.1826
Min Variance: 5.02e-06
p1=0.241, p2=0.224
--- Iter [1695/2000] ---
Total Loss: 1407.8733
MSE Component: 1.4035 (Weighted: 1403.4877)
NLL Component: 4.2984
Min Variance: 1.22e-05
p1=0.241, p2=0.224

```

```
--- Iter [1696/2000] ---
Total Loss: 1288.7495
MSE Component: 1.2841 (Weighted: 1284.1032)
NLL Component: 4.5591
Min Variance: 1.27e-05
p1=0.241, p2=0.223
--- Iter [1697/2000] ---
Total Loss: 1283.0646
MSE Component: 1.2785 (Weighted: 1278.5087)
NLL Component: 4.4686
Min Variance: 2.80e-05
p1=0.241, p2=0.223
--- Iter [1698/2000] ---
Total Loss: 1260.1425
MSE Component: 1.2532 (Weighted: 1253.1798)
NLL Component: 6.8754
Min Variance: 1.75e-05
p1=0.241, p2=0.223
--- Iter [1699/2000] ---
Total Loss: 1033.2516
MSE Component: 1.0288 (Weighted: 1028.8239)
NLL Component: 4.3404
Min Variance: 1.60e-05
p1=0.241, p2=0.223
--- Iter [1700/2000] ---
Total Loss: 1108.3901
MSE Component: 1.1046 (Weighted: 1104.6144)
NLL Component: 3.6884
Min Variance: 1.69e-05
p1=0.241, p2=0.223

--- Validation at iteration 1700 ---
Average MSE: 328.9963, Average ANEES: 129.7758
-----
--- Iter [1701/2000] ---
Total Loss: 1105.1205
MSE Component: 1.1015 (Weighted: 1101.4574)
NLL Component: 3.5758
Min Variance: 3.21e-06
p1=0.241, p2=0.223
--- Iter [1702/2000] ---
Total Loss: 1259.6934
MSE Component: 1.2542 (Weighted: 1254.1722)
NLL Component: 5.4338
Min Variance: 1.94e-05
p1=0.241, p2=0.223
--- Iter [1703/2000] ---
Total Loss: 1585.3800
```

MSE Component: 1.5810 (Weighted: 1581.0150)  
NLL Component: 4.2777  
Min Variance: 1.21e-05  
p1=0.241, p2=0.223  
--- Iter [1704/2000] ---  
Total Loss: 1411.6559  
MSE Component: 1.4075 (Weighted: 1407.4978)  
NLL Component: 4.0708  
Min Variance: 6.88e-06  
p1=0.241, p2=0.223  
--- Iter [1705/2000] ---  
Total Loss: 1003.7008  
MSE Component: 0.9984 (Weighted: 998.4490)  
NLL Component: 5.1645  
Min Variance: 1.17e-05  
p1=0.241, p2=0.223  
--- Iter [1706/2000] ---  
Total Loss: 1012.7353  
MSE Component: 1.0082 (Weighted: 1008.2279)  
NLL Component: 4.4200  
Min Variance: 1.08e-05  
p1=0.241, p2=0.223  
--- Iter [1707/2000] ---  
Total Loss: 1278.9480  
MSE Component: 1.2756 (Weighted: 1275.5877)  
NLL Component: 3.2730  
Min Variance: 1.85e-05  
p1=0.241, p2=0.223  
--- Iter [1708/2000] ---  
Total Loss: 1728.4301  
MSE Component: 1.7242 (Weighted: 1724.2330)  
NLL Component: 4.1097  
Min Variance: 1.33e-05  
p1=0.241, p2=0.223  
--- Iter [1709/2000] ---  
Total Loss: 1701.7673  
MSE Component: 1.6986 (Weighted: 1698.5662)  
NLL Component: 3.1139  
Min Variance: 1.01e-05  
p1=0.241, p2=0.223  
--- Iter [1710/2000] ---  
Total Loss: 1503.0044  
MSE Component: 1.4982 (Weighted: 1498.1779)  
NLL Component: 4.7393  
Min Variance: 2.89e-05  
p1=0.241, p2=0.223  
  
--- Validation at iteration 1710 ---

Average MSE: 343.8442, Average ANEES: 155.8881

---

--- Iter [1711/2000] ---  
Total Loss: 1781.7766  
MSE Component: 1.7773 (Weighted: 1777.3229)  
NLL Component: 4.3665  
Min Variance: 9.77e-06  
p1=0.241, p2=0.223  
--- Iter [1712/2000] ---  
Total Loss: 949.2564  
MSE Component: 0.9450 (Weighted: 944.9822)  
NLL Component: 4.1869  
Min Variance: 2.06e-05  
p1=0.241, p2=0.223  
--- Iter [1713/2000] ---  
Total Loss: 1029.8019  
MSE Component: 1.0265 (Weighted: 1026.5296)  
NLL Component: 3.1851  
Min Variance: 1.94e-05  
p1=0.241, p2=0.223  
--- Iter [1714/2000] ---  
Total Loss: 1537.3646  
MSE Component: 1.5318 (Weighted: 1531.8292)  
NLL Component: 5.4481  
Min Variance: 6.22e-06  
p1=0.241, p2=0.223  
--- Iter [1715/2000] ---  
Total Loss: 1680.2317  
MSE Component: 1.6765 (Weighted: 1676.4609)  
NLL Component: 3.6835  
Min Variance: 2.52e-05  
p1=0.241, p2=0.223  
--- Iter [1716/2000] ---  
Total Loss: 1566.4128  
MSE Component: 1.5627 (Weighted: 1562.7497)  
NLL Component: 3.5758  
Min Variance: 9.05e-06  
p1=0.241, p2=0.223  
--- Iter [1717/2000] ---  
Total Loss: 1755.8080  
MSE Component: 1.7510 (Weighted: 1751.0304)  
NLL Component: 4.6903  
Min Variance: 2.93e-05  
p1=0.241, p2=0.223  
--- Iter [1718/2000] ---  
Total Loss: 1647.7261  
MSE Component: 1.6444 (Weighted: 1644.4198)  
NLL Component: 3.2190

```

Min Variance: 2.11e-05
p1=0.241, p2=0.223
--- Iter [1719/2000] ---
Total Loss: 1306.9004
MSE Component: 1.3022 (Weighted: 1302.1711)
NLL Component: 4.6419
Min Variance: 1.24e-06
p1=0.241, p2=0.223
--- Iter [1720/2000] ---
Total Loss: 991.2697
MSE Component: 0.9884 (Weighted: 988.3570)
NLL Component: 2.8254
Min Variance: 5.97e-06
p1=0.241, p2=0.223

--- Validation at iteration 1720 ---
Average MSE: 336.4821, Average ANEES: 121.5796
-----
--- Iter [1721/2000] ---
Total Loss: 1525.4771
MSE Component: 1.5205 (Weighted: 1520.5430)
NLL Component: 4.8469
Min Variance: 6.47e-06
p1=0.241, p2=0.223
--- Iter [1722/2000] ---
Total Loss: 1644.2662
MSE Component: 1.6412 (Weighted: 1641.2060)
NLL Component: 2.9729
Min Variance: 7.28e-06
p1=0.241, p2=0.223
--- Iter [1723/2000] ---
Total Loss: 2365.7102
MSE Component: 2.3617 (Weighted: 2361.6681)
NLL Component: 3.9547
Min Variance: 1.70e-05
p1=0.241, p2=0.223
--- Iter [1724/2000] ---
Total Loss: 1932.6829
MSE Component: 1.9276 (Weighted: 1927.6354)
NLL Component: 4.9602
Min Variance: 1.69e-05
p1=0.241, p2=0.223
--- Iter [1725/2000] ---
Total Loss: 2694.5867
MSE Component: 2.6901 (Weighted: 2690.1300)
NLL Component: 4.3696
Min Variance: 2.80e-05
p1=0.241, p2=0.223

```

```

--- Iter [1726/2000] ---
Total Loss: 2071.3367
MSE Component: 2.0678 (Weighted: 2067.7824)
NLL Component: 3.4670
Min Variance: 9.11e-06
p1=0.241, p2=0.223
--- Iter [1727/2000] ---
Total Loss: 2478.6812
MSE Component: 2.4739 (Weighted: 2473.8600)
NLL Component: 4.7340
Min Variance: 1.19e-05
p1=0.241, p2=0.223
--- Iter [1728/2000] ---
Total Loss: 2293.4160
MSE Component: 2.2874 (Weighted: 2287.3883)
NLL Component: 5.9405
Min Variance: 1.47e-05
p1=0.241, p2=0.223
--- Iter [1729/2000] ---
Total Loss: 1635.4020
MSE Component: 1.6314 (Weighted: 1631.4124)
NLL Component: 3.9024
Min Variance: 2.56e-05
p1=0.241, p2=0.223
--- Iter [1730/2000] ---
Total Loss: 1251.4916
MSE Component: 1.2466 (Weighted: 1246.6254)
NLL Component: 4.7790
Min Variance: 1.18e-05
p1=0.241, p2=0.223

--- Validation at iteration 1730 ---
Average MSE: 311.6417, Average ANEES: 180.7485
-----
--- Iter [1731/2000] ---
Total Loss: 1344.5955
MSE Component: 1.3398 (Weighted: 1339.7543)
NLL Component: 4.7538
Min Variance: 1.57e-05
p1=0.241, p2=0.223
--- Iter [1732/2000] ---
Total Loss: 1633.3971
MSE Component: 1.6294 (Weighted: 1629.3505)
NLL Component: 3.9592
Min Variance: 6.23e-06
p1=0.241, p2=0.223
--- Iter [1733/2000] ---
Total Loss: 3082.7026

```

MSE Component: 3.0794 (Weighted: 3079.4494)  
NLL Component: 3.1659  
Min Variance: 1.83e-05  
p1=0.241, p2=0.223  
--- Iter [1734/2000] ---  
Total Loss: 2588.2615  
MSE Component: 2.5831 (Weighted: 2583.1387)  
NLL Component: 5.0356  
Min Variance: 2.11e-05  
p1=0.241, p2=0.223  
--- Iter [1735/2000] ---  
Total Loss: 2914.0601  
MSE Component: 2.9102 (Weighted: 2910.2166)  
NLL Component: 3.7562  
Min Variance: 1.60e-05  
p1=0.241, p2=0.223  
--- Iter [1736/2000] ---  
Total Loss: 2500.8726  
MSE Component: 2.4966 (Weighted: 2496.6478)  
NLL Component: 4.1374  
Min Variance: 1.07e-05  
p1=0.241, p2=0.223  
--- Iter [1737/2000] ---  
Total Loss: 2441.6609  
MSE Component: 2.4367 (Weighted: 2436.6689)  
NLL Component: 4.9047  
Min Variance: 2.25e-05  
p1=0.241, p2=0.223  
--- Iter [1738/2000] ---  
Total Loss: 2025.6207  
MSE Component: 2.0213 (Weighted: 2021.3351)  
NLL Component: 4.1984  
Min Variance: 3.77e-06  
p1=0.241, p2=0.223  
--- Iter [1739/2000] ---  
Total Loss: 1884.2706  
MSE Component: 1.8798 (Weighted: 1879.8250)  
NLL Component: 4.3584  
Min Variance: 1.40e-05  
p1=0.241, p2=0.223  
--- Iter [1740/2000] ---  
Total Loss: 1494.5109  
MSE Component: 1.4918 (Weighted: 1491.8472)  
NLL Component: 2.5764  
Min Variance: 9.50e-06  
p1=0.241, p2=0.223  
  
--- Validation at iteration 1740 ---

Average MSE: 329.7664, Average ANEES: 132.3983

---

--- Iter [1741/2000] ---  
Total Loss: 1101.7095  
MSE Component: 1.0976 (Weighted: 1097.6349)  
NLL Component: 3.9873  
Min Variance: 7.11e-06  
p1=0.241, p2=0.223  
--- Iter [1742/2000] ---  
Total Loss: 982.8875  
MSE Component: 0.9797 (Weighted: 979.6729)  
NLL Component: 3.1274  
Min Variance: 3.18e-05  
p1=0.241, p2=0.223  
--- Iter [1743/2000] ---  
Total Loss: 1477.1243  
MSE Component: 1.4727 (Weighted: 1472.7480)  
NLL Component: 4.2890  
Min Variance: 1.56e-05  
p1=0.241, p2=0.223  
--- Iter [1744/2000] ---  
Total Loss: 1896.2474  
MSE Component: 1.8902 (Weighted: 1890.1557)  
NLL Component: 6.0045  
Min Variance: 1.55e-05  
p1=0.241, p2=0.223  
--- Iter [1745/2000] ---  
Total Loss: 1651.1417  
MSE Component: 1.6463 (Weighted: 1646.3437)  
NLL Component: 4.7107  
Min Variance: 1.22e-05  
p1=0.241, p2=0.223  
--- Iter [1746/2000] ---  
Total Loss: 1945.7689  
MSE Component: 1.9420 (Weighted: 1941.9857)  
NLL Component: 3.6959  
Min Variance: 1.52e-05  
p1=0.241, p2=0.223  
--- Iter [1747/2000] ---  
Total Loss: 1697.5964  
MSE Component: 1.6935 (Weighted: 1693.5160)  
NLL Component: 3.9931  
Min Variance: 5.98e-06  
p1=0.241, p2=0.223  
--- Iter [1748/2000] ---  
Total Loss: 1567.4128  
MSE Component: 1.5639 (Weighted: 1563.8758)  
NLL Component: 3.4498

```

Min Variance: 3.35e-06
p1=0.241, p2=0.223
--- Iter [1749/2000] ---
Total Loss: 1816.4132
MSE Component: 1.8124 (Weighted: 1812.3555)
NLL Component: 3.9705
Min Variance: 1.45e-05
p1=0.241, p2=0.223
--- Iter [1750/2000] ---
Total Loss: 1182.8328
MSE Component: 1.1775 (Weighted: 1177.5138)
NLL Component: 5.2317
Min Variance: 1.82e-05
p1=0.241, p2=0.223

--- Validation at iteration 1750 ---
Average MSE: 355.3965, Average ANEES: 154.4475
-----
--- Iter [1751/2000] ---
Total Loss: 1360.4558
MSE Component: 1.3556 (Weighted: 1355.5747)
NLL Component: 4.7938
Min Variance: 1.45e-05
p1=0.241, p2=0.223
--- Iter [1752/2000] ---
Total Loss: 1480.3639
MSE Component: 1.4764 (Weighted: 1476.4037)
NLL Component: 3.8729
Min Variance: 5.22e-06
p1=0.241, p2=0.223
--- Iter [1753/2000] ---
Total Loss: 1826.2793
MSE Component: 1.8227 (Weighted: 1822.7236)
NLL Component: 3.4684
Min Variance: 1.52e-05
p1=0.241, p2=0.223
--- Iter [1754/2000] ---
Total Loss: 2078.2312
MSE Component: 2.0740 (Weighted: 2073.9861)
NLL Component: 4.1579
Min Variance: 2.39e-05
p1=0.241, p2=0.223
--- Iter [1755/2000] ---
Total Loss: 1489.7998
MSE Component: 1.4857 (Weighted: 1485.6718)
NLL Component: 4.0408
Min Variance: 1.41e-05
p1=0.241, p2=0.223

```

```

--- Iter [1756/2000] ---
Total Loss: 2196.4836
MSE Component: 2.1923 (Weighted: 2192.3022)
NLL Component: 4.0943
Min Variance: 8.17e-06
p1=0.241, p2=0.223
--- Iter [1757/2000] ---
Total Loss: 1522.0677
MSE Component: 1.5183 (Weighted: 1518.3308)
NLL Component: 3.6497
Min Variance: 1.32e-05
p1=0.241, p2=0.223
--- Iter [1758/2000] ---
Total Loss: 1674.1564
MSE Component: 1.6688 (Weighted: 1668.8095)
NLL Component: 5.2595
Min Variance: 1.25e-05
p1=0.241, p2=0.223
--- Iter [1759/2000] ---
Total Loss: 1334.8611
MSE Component: 1.3305 (Weighted: 1330.4794)
NLL Component: 4.2945
Min Variance: 6.68e-06
p1=0.241, p2=0.223
--- Iter [1760/2000] ---
Total Loss: 1325.6893
MSE Component: 1.3223 (Weighted: 1322.2510)
NLL Component: 3.3510
Min Variance: 2.16e-05
p1=0.240, p2=0.223

--- Validation at iteration 1760 ---
Average MSE: 306.8404, Average ANEES: 142.9633
-----
--- Iter [1761/2000] ---
Total Loss: 1298.0321
MSE Component: 1.2932 (Weighted: 1293.1992)
NLL Component: 4.7457
Min Variance: 1.67e-05
p1=0.240, p2=0.223
--- Iter [1762/2000] ---
Total Loss: 1261.6882
MSE Component: 1.2569 (Weighted: 1256.9295)
NLL Component: 4.6715
Min Variance: 5.03e-06
p1=0.240, p2=0.223
--- Iter [1763/2000] ---
Total Loss: 2540.8125

```

MSE Component: 2.5367 (Weighted: 2536.7060)  
NLL Component: 4.0192  
Min Variance: 2.70e-05  
p1=0.240, p2=0.223  
--- Iter [1764/2000] ---  
Total Loss: 2342.3870  
MSE Component: 2.3383 (Weighted: 2338.2788)  
NLL Component: 4.0209  
Min Variance: 8.16e-06  
p1=0.240, p2=0.223  
--- Iter [1765/2000] ---  
Total Loss: 2461.3779  
MSE Component: 2.4575 (Weighted: 2457.4904)  
NLL Component: 3.8003  
Min Variance: 1.09e-05  
p1=0.240, p2=0.223  
--- Iter [1766/2000] ---  
Total Loss: 2498.1555  
MSE Component: 2.4934 (Weighted: 2493.4237)  
NLL Component: 4.6448  
Min Variance: 7.58e-06  
p1=0.240, p2=0.223  
--- Iter [1767/2000] ---  
Total Loss: 1983.8986  
MSE Component: 1.9787 (Weighted: 1978.6646)  
NLL Component: 5.1467  
Min Variance: 1.09e-05  
p1=0.240, p2=0.223  
--- Iter [1768/2000] ---  
Total Loss: 1632.6371  
MSE Component: 1.6267 (Weighted: 1626.7292)  
NLL Component: 5.8207  
Min Variance: 1.34e-05  
p1=0.240, p2=0.223  
--- Iter [1769/2000] ---  
Total Loss: 1571.7297  
MSE Component: 1.5686 (Weighted: 1568.5939)  
NLL Component: 3.0487  
Min Variance: 2.63e-05  
p1=0.240, p2=0.223  
--- Iter [1770/2000] ---  
Total Loss: 1425.4304  
MSE Component: 1.4211 (Weighted: 1421.0560)  
NLL Component: 4.2873  
Min Variance: 1.89e-05  
p1=0.240, p2=0.223  
  
--- Validation at iteration 1770 ---

Average MSE: 386.2290, Average ANEES: 146.4767

---

--- Iter [1771/2000] ---  
Total Loss: 1298.2513  
MSE Component: 1.2932 (Weighted: 1293.2273)  
NLL Component: 4.9369  
Min Variance: 7.66e-06  
p1=0.240, p2=0.223  
--- Iter [1772/2000] ---  
Total Loss: 1224.2773  
MSE Component: 1.2205 (Weighted: 1220.5009)  
NLL Component: 3.6892  
Min Variance: 6.00e-06  
p1=0.240, p2=0.223  
--- Iter [1773/2000] ---  
Total Loss: 1256.9192  
MSE Component: 1.2532 (Weighted: 1253.2146)  
NLL Component: 3.6174  
Min Variance: 1.71e-05  
p1=0.240, p2=0.223  
--- Iter [1774/2000] ---  
Total Loss: 1476.1819  
MSE Component: 1.4724 (Weighted: 1472.4334)  
NLL Component: 3.6613  
Min Variance: 2.40e-05  
p1=0.240, p2=0.223  
--- Iter [1775/2000] ---  
Total Loss: 1511.9918  
MSE Component: 1.5084 (Weighted: 1508.3776)  
NLL Component: 3.5272  
Min Variance: 1.14e-05  
p1=0.240, p2=0.223  
--- Iter [1776/2000] ---  
Total Loss: 1479.0277  
MSE Component: 1.4751 (Weighted: 1475.1457)  
NLL Component: 3.7948  
Min Variance: 1.39e-05  
p1=0.240, p2=0.223  
--- Iter [1777/2000] ---  
Total Loss: 1432.5383  
MSE Component: 1.4289 (Weighted: 1428.9277)  
NLL Component: 3.5236  
Min Variance: 1.93e-05  
p1=0.240, p2=0.223  
--- Iter [1778/2000] ---  
Total Loss: 1353.9811  
MSE Component: 1.3492 (Weighted: 1349.1691)  
NLL Component: 4.7247

```

Min Variance: 1.85e-05
p1=0.240, p2=0.223
--- Iter [1779/2000] ---
Total Loss: 1364.7885
MSE Component: 1.3615 (Weighted: 1361.4646)
NLL Component: 3.2367
Min Variance: 1.19e-05
p1=0.240, p2=0.223
--- Iter [1780/2000] ---
Total Loss: 1225.8561
MSE Component: 1.2220 (Weighted: 1222.0398)
NLL Component: 3.7292
Min Variance: 1.71e-05
p1=0.240, p2=0.223

--- Validation at iteration 1780 ---
Average MSE: 369.3162, Average ANEES: 115.5890
-----
--- Iter [1781/2000] ---
Total Loss: 1137.8951
MSE Component: 1.1326 (Weighted: 1132.5589)
NLL Component: 5.2490
Min Variance: 2.27e-05
p1=0.240, p2=0.223
--- Iter [1782/2000] ---
Total Loss: 1067.5753
MSE Component: 1.0624 (Weighted: 1062.4384)
NLL Component: 5.0497
Min Variance: 2.04e-05
p1=0.240, p2=0.223
--- Iter [1783/2000] ---
Total Loss: 1497.1539
MSE Component: 1.4932 (Weighted: 1493.2474)
NLL Component: 3.8194
Min Variance: 6.39e-06
p1=0.240, p2=0.223
--- Iter [1784/2000] ---
Total Loss: 978.2404
MSE Component: 0.9732 (Weighted: 973.1979)
NLL Component: 4.9552
Min Variance: 9.70e-06
p1=0.240, p2=0.223
--- Iter [1785/2000] ---
Total Loss: 998.9162
MSE Component: 0.9944 (Weighted: 994.4406)
NLL Component: 4.3884
Min Variance: 8.06e-06
p1=0.240, p2=0.223

```

```

--- Iter [1786/2000] ---
Total Loss: 1143.5433
MSE Component: 1.1395 (Weighted: 1139.4815)
NLL Component: 3.9746
Min Variance: 1.72e-05
p1=0.240, p2=0.223
--- Iter [1787/2000] ---
Total Loss: 1104.1555
MSE Component: 1.1012 (Weighted: 1101.1565)
NLL Component: 2.9118
Min Variance: 8.84e-06
p1=0.240, p2=0.223
--- Iter [1788/2000] ---
Total Loss: 1355.7412
MSE Component: 1.3513 (Weighted: 1351.2508)
NLL Component: 4.4033
Min Variance: 1.87e-05
p1=0.240, p2=0.223
--- Iter [1789/2000] ---
Total Loss: 1326.2141
MSE Component: 1.3230 (Weighted: 1323.0164)
NLL Component: 3.1106
Min Variance: 1.76e-05
p1=0.240, p2=0.223
--- Iter [1790/2000] ---
Total Loss: 1495.9546
MSE Component: 1.4911 (Weighted: 1491.1181)
NLL Component: 4.7494
Min Variance: 5.25e-06
p1=0.240, p2=0.223

--- Validation at iteration 1790 ---
Average MSE: 365.5129, Average ANEES: 65.5947
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [1791/2000] ---
Total Loss: 1231.0321
MSE Component: 1.2273 (Weighted: 1227.3139)
NLL Component: 3.6311
Min Variance: 5.52e-06
p1=0.240, p2=0.223
--- Iter [1792/2000] ---
Total Loss: 1348.6781
MSE Component: 1.3445 (Weighted: 1344.4818)
NLL Component: 4.1091
Min Variance: 2.50e-05
p1=0.240, p2=0.223
--- Iter [1793/2000] ---

```

Total Loss: 1909.8402  
MSE Component: 1.9066 (Weighted: 1906.6470)  
NLL Component: 3.1061  
Min Variance: 2.12e-05  
p1=0.240, p2=0.223  
--- Iter [1794/2000] ---  
Total Loss: 1211.2638  
MSE Component: 1.2070 (Weighted: 1206.9610)  
NLL Component: 4.2155  
Min Variance: 3.97e-06  
p1=0.240, p2=0.223  
--- Iter [1795/2000] ---  
Total Loss: 2138.9744  
MSE Component: 2.1344 (Weighted: 2134.3939)  
NLL Component: 4.4932  
Min Variance: 2.13e-05  
p1=0.240, p2=0.223  
--- Iter [1796/2000] ---  
Total Loss: 1454.4899  
MSE Component: 1.4499 (Weighted: 1449.9104)  
NLL Component: 4.4924  
Min Variance: 6.70e-06  
p1=0.240, p2=0.223  
--- Iter [1797/2000] ---  
Total Loss: 972.8840  
MSE Component: 0.9685 (Weighted: 968.5224)  
NLL Component: 4.2745  
Min Variance: 1.08e-05  
p1=0.240, p2=0.223  
--- Iter [1798/2000] ---  
Total Loss: 1049.6740  
MSE Component: 1.0455 (Weighted: 1045.4856)  
NLL Component: 4.1013  
Min Variance: 5.93e-06  
p1=0.240, p2=0.223  
--- Iter [1799/2000] ---  
Total Loss: 1239.2130  
MSE Component: 1.2347 (Weighted: 1234.6667)  
NLL Component: 4.4591  
Min Variance: 1.34e-05  
p1=0.240, p2=0.223  
--- Iter [1800/2000] ---  
Total Loss: 1643.6807  
MSE Component: 1.6387 (Weighted: 1638.7124)  
NLL Component: 4.8811  
Min Variance: 1.00e-05  
p1=0.240, p2=0.223

```
--- Validation at iteration 1800 ---
  Average MSE: 355.0560, Average ANEES: 103.3066
-----
--- Iter [1801/2000] ---
  Total Loss: 1368.6104
  MSE Component: 1.3629 (Weighted: 1362.8694)
  NLL Component: 5.6538
  Min Variance: 1.96e-05
  p1=0.240, p2=0.223
--- Iter [1802/2000] ---
  Total Loss: 1226.1400
  MSE Component: 1.2217 (Weighted: 1221.6957)
  NLL Component: 4.3572
  Min Variance: 5.51e-06
  p1=0.240, p2=0.223
--- Iter [1803/2000] ---
  Total Loss: 931.3597
  MSE Component: 0.9272 (Weighted: 927.1780)
  NLL Component: 4.0946
  Min Variance: 8.91e-06
  p1=0.240, p2=0.223
--- Iter [1804/2000] ---
  Total Loss: 1090.1350
  MSE Component: 1.0853 (Weighted: 1085.2897)
  NLL Component: 4.7582
  Min Variance: 4.83e-06
  p1=0.240, p2=0.223
--- Iter [1805/2000] ---
  Total Loss: 1333.0232
  MSE Component: 1.3299 (Weighted: 1329.8960)
  NLL Component: 3.0401
  Min Variance: 1.83e-05
  p1=0.240, p2=0.223
--- Iter [1806/2000] ---
  Total Loss: 1075.6284
  MSE Component: 1.0725 (Weighted: 1072.4536)
  NLL Component: 3.0876
  Min Variance: 1.15e-05
  p1=0.240, p2=0.223
--- Iter [1807/2000] ---
  Total Loss: 993.4370
  MSE Component: 0.9888 (Weighted: 988.8101)
  NLL Component: 4.5397
  Min Variance: 8.02e-06
  p1=0.240, p2=0.223
--- Iter [1808/2000] ---
  Total Loss: 1307.6597
  MSE Component: 1.3025 (Weighted: 1302.5442)
```

```

NLL Component: 5.0283
Min Variance: 8.47e-06
p1=0.240, p2=0.223
--- Iter [1809/2000] ---
Total Loss: 837.3105
MSE Component: 0.8341 (Weighted: 834.1424)
NLL Component: 3.0809
Min Variance: 7.19e-06
p1=0.240, p2=0.223
--- Iter [1810/2000] ---
Total Loss: 1028.9149
MSE Component: 1.0261 (Weighted: 1026.0941)
NLL Component: 2.7336
Min Variance: 8.56e-06
p1=0.240, p2=0.223

--- Validation at iteration 1810 ---
Average MSE: 444.1779, Average ANEES: 65.5429
>>> New best VALIDATION ANEES! Saving model. <<<
-----
--- Iter [1811/2000] ---
Total Loss: 1322.6475
MSE Component: 1.3185 (Weighted: 1318.5315)
NLL Component: 4.0288
Min Variance: 1.64e-05
p1=0.240, p2=0.223
--- Iter [1812/2000] ---
Total Loss: 1531.1265
MSE Component: 1.5276 (Weighted: 1527.6489)
NLL Component: 3.3904
Min Variance: 8.44e-06
p1=0.240, p2=0.223
--- Iter [1813/2000] ---
Total Loss: 1334.1595
MSE Component: 1.3294 (Weighted: 1329.4450)
NLL Component: 4.6274
Min Variance: 7.25e-06
p1=0.240, p2=0.222
--- Iter [1814/2000] ---
Total Loss: 1658.8005
MSE Component: 1.6547 (Weighted: 1654.7167)
NLL Component: 3.9967
Min Variance: 1.30e-05
p1=0.240, p2=0.222
--- Iter [1815/2000] ---
Total Loss: 1225.9120
MSE Component: 1.2225 (Weighted: 1222.5255)
NLL Component: 3.2994

```

```

Min Variance: 2.01e-05
p1=0.240, p2=0.222
--- Iter [1816/2000] ---
Total Loss: 2804.4417
MSE Component: 2.7999 (Weighted: 2799.9492)
NLL Component: 4.4053
Min Variance: 5.05e-06
p1=0.240, p2=0.222
--- Iter [1817/2000] ---
Total Loss: 1544.0232
MSE Component: 1.5409 (Weighted: 1540.8658)
NLL Component: 3.0703
Min Variance: 1.05e-05
p1=0.240, p2=0.222
--- Iter [1818/2000] ---
Total Loss: 1189.0817
MSE Component: 1.1854 (Weighted: 1185.4188)
NLL Component: 3.5757
Min Variance: 5.07e-06
p1=0.240, p2=0.222
--- Iter [1819/2000] ---
Total Loss: 1334.5604
MSE Component: 1.3303 (Weighted: 1330.2780)
NLL Component: 4.1952
Min Variance: 1.31e-05
p1=0.240, p2=0.222
--- Iter [1820/2000] ---
Total Loss: 1254.3732
MSE Component: 1.2503 (Weighted: 1250.3182)
NLL Component: 3.9679
Min Variance: 1.32e-05
p1=0.240, p2=0.222

--- Validation at iteration 1820 ---
Average MSE: 411.4088, Average ANEES: 91.2940
-----
--- Iter [1821/2000] ---
Total Loss: 1259.0094
MSE Component: 1.2552 (Weighted: 1255.2006)
NLL Component: 3.7216
Min Variance: 2.81e-05
p1=0.240, p2=0.222
--- Iter [1822/2000] ---
Total Loss: 1573.3192
MSE Component: 1.5680 (Weighted: 1568.0324)
NLL Component: 5.1997
Min Variance: 1.65e-05
p1=0.240, p2=0.222

```

```
--- Iter [1823/2000] ---
Total Loss: 1161.1398
MSE Component: 1.1572 (Weighted: 1157.2207)
NLL Component: 3.8319
Min Variance: 1.15e-05
p1=0.240, p2=0.222
--- Iter [1824/2000] ---
Total Loss: 806.3856
MSE Component: 0.8034 (Weighted: 803.4438)
NLL Component: 2.8546
Min Variance: 1.16e-05
p1=0.239, p2=0.222
--- Iter [1825/2000] ---
Total Loss: 1066.3496
MSE Component: 1.0621 (Weighted: 1062.0923)
NLL Component: 4.1702
Min Variance: 2.19e-05
p1=0.239, p2=0.222
--- Iter [1826/2000] ---
Total Loss: 1379.7284
MSE Component: 1.3751 (Weighted: 1375.1186)
NLL Component: 4.5226
Min Variance: 1.09e-05
p1=0.239, p2=0.222
--- Iter [1827/2000] ---
Total Loss: 1590.3716
MSE Component: 1.5864 (Weighted: 1586.3698)
NLL Component: 3.9146
Min Variance: 6.07e-06
p1=0.239, p2=0.222
--- Iter [1828/2000] ---
Total Loss: 1226.9186
MSE Component: 1.2235 (Weighted: 1223.4873)
NLL Component: 3.3441
Min Variance: 1.30e-05
p1=0.239, p2=0.222
--- Iter [1829/2000] ---
Total Loss: 1197.2097
MSE Component: 1.1932 (Weighted: 1193.1971)
NLL Component: 3.9254
Min Variance: 1.44e-05
p1=0.239, p2=0.222
--- Iter [1830/2000] ---
Total Loss: 1271.7911
MSE Component: 1.2677 (Weighted: 1267.6567)
NLL Component: 4.0473
Min Variance: 1.36e-05
p1=0.239, p2=0.222
```

```
--- Validation at iteration 1830 ---
  Average MSE: 337.5705, Average ANEES: 76.8617
-----
--- Iter [1831/2000] ---
  Total Loss: 1350.5763
  MSE Component: 1.3464 (Weighted: 1346.3690)
  NLL Component: 4.1201
  Min Variance: 1.73e-05
  p1=0.239, p2=0.222
--- Iter [1832/2000] ---
  Total Loss: 1134.4290
  MSE Component: 1.1297 (Weighted: 1129.7011)
  NLL Component: 4.6406
  Min Variance: 9.59e-06
  p1=0.239, p2=0.222
--- Iter [1833/2000] ---
  Total Loss: 860.0209
  MSE Component: 0.8567 (Weighted: 856.6619)
  NLL Component: 3.2719
  Min Variance: 9.47e-06
  p1=0.239, p2=0.222
--- Iter [1834/2000] ---
  Total Loss: 1053.8787
  MSE Component: 1.0504 (Weighted: 1050.4127)
  NLL Component: 3.3789
  Min Variance: 8.41e-06
  p1=0.239, p2=0.222
--- Iter [1835/2000] ---
  Total Loss: 963.6146
  MSE Component: 0.9603 (Weighted: 960.3155)
  NLL Component: 3.2120
  Min Variance: 1.57e-05
  p1=0.239, p2=0.222
--- Iter [1836/2000] ---
  Total Loss: 1239.1301
  MSE Component: 1.2346 (Weighted: 1234.5824)
  NLL Component: 4.4606
  Min Variance: 1.03e-05
  p1=0.239, p2=0.222
--- Iter [1837/2000] ---
  Total Loss: 1211.6101
  MSE Component: 1.2073 (Weighted: 1207.3486)
  NLL Component: 4.1743
  Min Variance: 1.41e-05
  p1=0.239, p2=0.222
--- Iter [1838/2000] ---
  Total Loss: 1090.4915
```

MSE Component: 1.0871 (Weighted: 1087.1078)  
NLL Component: 3.2965  
Min Variance: 7.61e-06  
p1=0.239, p2=0.222  
--- Iter [1839/2000] ---  
Total Loss: 1186.3362  
MSE Component: 1.1820 (Weighted: 1181.9953)  
NLL Component: 4.2538  
Min Variance: 7.81e-06  
p1=0.239, p2=0.222  
--- Iter [1840/2000] ---  
Total Loss: 1242.4288  
MSE Component: 1.2382 (Weighted: 1238.2437)  
NLL Component: 4.0980  
Min Variance: 1.46e-05  
p1=0.239, p2=0.222

--- Validation at iteration 1840 ---  
Average MSE: 366.3672, Average ANEES: 155.7248

---

--- Iter [1841/2000] ---  
Total Loss: 1075.6042  
MSE Component: 1.0716 (Weighted: 1071.6436)  
NLL Component: 3.8735  
Min Variance: 6.68e-06  
p1=0.239, p2=0.222  
--- Iter [1842/2000] ---  
Total Loss: 855.1447  
MSE Component: 0.8504 (Weighted: 850.3943)  
NLL Component: 4.6633  
Min Variance: 7.80e-06  
p1=0.239, p2=0.222  
--- Iter [1843/2000] ---  
Total Loss: 919.0718  
MSE Component: 0.9157 (Weighted: 915.6685)  
NLL Component: 3.3161  
Min Variance: 2.54e-05  
p1=0.239, p2=0.222  
--- Iter [1844/2000] ---  
Total Loss: 923.1802  
MSE Component: 0.9186 (Weighted: 918.6189)  
NLL Component: 4.4742  
Min Variance: 4.70e-06  
p1=0.239, p2=0.222  
--- Iter [1845/2000] ---  
Total Loss: 1004.6921  
MSE Component: 1.0012 (Weighted: 1001.1505)  
NLL Component: 3.4545

```

Min Variance: 2.88e-05
p1=0.239, p2=0.222
--- Iter [1846/2000] ---
Total Loss: 924.7872
MSE Component: 0.9204 (Weighted: 920.4366)
NLL Component: 4.2634
Min Variance: 1.80e-05
p1=0.239, p2=0.222
--- Iter [1847/2000] ---
Total Loss: 1231.8870
MSE Component: 1.2279 (Weighted: 1227.8590)
NLL Component: 3.9409
Min Variance: 2.08e-06
p1=0.239, p2=0.222
--- Iter [1848/2000] ---
Total Loss: 1255.8539
MSE Component: 1.2519 (Weighted: 1251.9321)
NLL Component: 3.8346
Min Variance: 2.16e-05
p1=0.239, p2=0.222
--- Iter [1849/2000] ---
Total Loss: 903.5295
MSE Component: 0.9002 (Weighted: 900.1520)
NLL Component: 3.2904
Min Variance: 2.00e-05
p1=0.239, p2=0.222
--- Iter [1850/2000] ---
Total Loss: 1118.0455
MSE Component: 1.1140 (Weighted: 1113.9802)
NLL Component: 3.9782
Min Variance: 1.24e-05
p1=0.239, p2=0.222

--- Validation at iteration 1850 ---
Average MSE: 316.2144, Average ANEES: 104.1846
-----
--- Iter [1851/2000] ---
Total Loss: 1132.7971
MSE Component: 1.1292 (Weighted: 1129.2247)
NLL Component: 3.4854
Min Variance: 1.23e-05
p1=0.239, p2=0.222
--- Iter [1852/2000] ---
Total Loss: 991.9121
MSE Component: 0.9882 (Weighted: 988.1503)
NLL Component: 3.6747
Min Variance: 8.19e-06
p1=0.239, p2=0.222

```

```
--- Iter [1853/2000] ---
Total Loss: 968.1983
MSE Component: 0.9641 (Weighted: 964.1053)
NLL Component: 4.0058
Min Variance: 1.67e-05
p1=0.239, p2=0.222
--- Iter [1854/2000] ---
Total Loss: 971.1870
MSE Component: 0.9679 (Weighted: 967.9480)
NLL Component: 3.1518
Min Variance: 2.23e-05
p1=0.239, p2=0.222
--- Iter [1855/2000] ---
Total Loss: 1244.8760
MSE Component: 1.2411 (Weighted: 1241.0660)
NLL Component: 3.7228
Min Variance: 8.27e-06
p1=0.239, p2=0.222
--- Iter [1856/2000] ---
Total Loss: 985.2451
MSE Component: 0.9815 (Weighted: 981.5323)
NLL Component: 3.6256
Min Variance: 1.48e-05
p1=0.239, p2=0.222
--- Iter [1857/2000] ---
Total Loss: 769.9998
MSE Component: 0.7660 (Weighted: 765.9781)
NLL Component: 3.9345
Min Variance: 4.11e-06
p1=0.239, p2=0.222
--- Iter [1858/2000] ---
Total Loss: 1046.5103
MSE Component: 1.0412 (Weighted: 1041.2409)
NLL Component: 5.1821
Min Variance: 1.11e-05
p1=0.239, p2=0.222
--- Iter [1859/2000] ---
Total Loss: 871.0116
MSE Component: 0.8679 (Weighted: 867.9388)
NLL Component: 2.9857
Min Variance: 8.69e-06
p1=0.239, p2=0.222
--- Iter [1860/2000] ---
Total Loss: 849.7281
MSE Component: 0.8473 (Weighted: 847.2679)
NLL Component: 2.3730
Min Variance: 1.23e-05
p1=0.239, p2=0.222
```

```
--- Validation at iteration 1860 ---
  Average MSE: 339.5854, Average ANEES: 101.3511
-----
--- Iter [1861/2000] ---
  Total Loss: 825.8134
  MSE Component: 0.8224 (Weighted: 822.4162)
  NLL Component: 3.3101
  Min Variance: 8.48e-06
  p1=0.239, p2=0.222
--- Iter [1862/2000] ---
  Total Loss: 988.1498
  MSE Component: 0.9841 (Weighted: 984.0613)
  NLL Component: 4.0014
  Min Variance: 2.59e-05
  p1=0.239, p2=0.222
--- Iter [1863/2000] ---
  Total Loss: 1107.7721
  MSE Component: 1.1042 (Weighted: 1104.2022)
  NLL Component: 3.4828
  Min Variance: 2.42e-05
  p1=0.239, p2=0.222
--- Iter [1864/2000] ---
  Total Loss: 1018.4161
  MSE Component: 1.0149 (Weighted: 1014.9366)
  NLL Component: 3.3923
  Min Variance: 9.90e-06
  p1=0.239, p2=0.222
--- Iter [1865/2000] ---
  Total Loss: 999.4895
  MSE Component: 0.9952 (Weighted: 995.2495)
  NLL Component: 4.1528
  Min Variance: 2.10e-06
  p1=0.239, p2=0.222
--- Iter [1866/2000] ---
  Total Loss: 1054.4100
  MSE Component: 1.0503 (Weighted: 1050.3482)
  NLL Component: 3.9747
  Min Variance: 1.62e-05
  p1=0.239, p2=0.222
--- Iter [1867/2000] ---
  Total Loss: 946.4632
  MSE Component: 0.9420 (Weighted: 941.9724)
  NLL Component: 4.4037
  Min Variance: 9.20e-06
  p1=0.239, p2=0.222
--- Iter [1868/2000] ---
  Total Loss: 1212.6545
```

MSE Component: 1.2086 (Weighted: 1208.6051)  
NLL Component: 3.9623  
Min Variance: 1.04e-05  
p1=0.239, p2=0.222  
--- Iter [1869/2000] ---  
Total Loss: 1121.1826  
MSE Component: 1.1169 (Weighted: 1116.8886)  
NLL Component: 4.2068  
Min Variance: 9.95e-06  
p1=0.239, p2=0.222  
--- Iter [1870/2000] ---  
Total Loss: 1129.9885  
MSE Component: 1.1271 (Weighted: 1127.0657)  
NLL Component: 2.8357  
Min Variance: 2.42e-05  
p1=0.239, p2=0.222

--- Validation at iteration 1870 ---  
Average MSE: 297.0437, Average ANEES: 139.6356

---

--- Iter [1871/2000] ---  
Total Loss: 989.1965  
MSE Component: 0.9843 (Weighted: 984.3296)  
NLL Component: 4.7797  
Min Variance: 1.46e-05  
p1=0.239, p2=0.222  
--- Iter [1872/2000] ---  
Total Loss: 914.9333  
MSE Component: 0.9124 (Weighted: 912.3977)  
NLL Component: 2.4485  
Min Variance: 1.50e-05  
p1=0.239, p2=0.222  
--- Iter [1873/2000] ---  
Total Loss: 1059.9083  
MSE Component: 1.0564 (Weighted: 1056.4250)  
NLL Component: 3.3962  
Min Variance: 2.43e-05  
p1=0.239, p2=0.222  
--- Iter [1874/2000] ---  
Total Loss: 991.8111  
MSE Component: 0.9888 (Weighted: 988.8075)  
NLL Component: 2.9165  
Min Variance: 1.01e-05  
p1=0.239, p2=0.222  
--- Iter [1875/2000] ---  
Total Loss: 1028.2115  
MSE Component: 1.0244 (Weighted: 1024.3744)  
NLL Component: 3.7500

```

Min Variance: 1.47e-05
p1=0.239, p2=0.222
--- Iter [1876/2000] ---
Total Loss: 1285.7491
MSE Component: 1.2817 (Weighted: 1281.7208)
NLL Component: 3.9412
Min Variance: 1.43e-05
p1=0.239, p2=0.222
--- Iter [1877/2000] ---
Total Loss: 1037.6622
MSE Component: 1.0346 (Weighted: 1034.5633)
NLL Component: 3.0117
Min Variance: 4.87e-06
p1=0.239, p2=0.222
--- Iter [1878/2000] ---
Total Loss: 1474.9928
MSE Component: 1.4715 (Weighted: 1471.5481)
NLL Component: 3.3576
Min Variance: 7.60e-06
p1=0.239, p2=0.222
--- Iter [1879/2000] ---
Total Loss: 1004.9549
MSE Component: 1.0011 (Weighted: 1001.1108)
NLL Component: 3.7570
Min Variance: 1.92e-05
p1=0.239, p2=0.222
--- Iter [1880/2000] ---
Total Loss: 914.0267
MSE Component: 0.9098 (Weighted: 909.8380)
NLL Component: 4.1015
Min Variance: 9.26e-06
p1=0.239, p2=0.222

--- Validation at iteration 1880 ---
Average MSE: 372.3038, Average ANEES: 122.5466
-----
--- Iter [1881/2000] ---
Total Loss: 1522.9561
MSE Component: 1.5203 (Weighted: 1520.2943)
NLL Component: 2.5746
Min Variance: 1.22e-05
p1=0.239, p2=0.222
--- Iter [1882/2000] ---
Total Loss: 1788.3629
MSE Component: 1.7845 (Weighted: 1784.4657)
NLL Component: 3.8100
Min Variance: 4.75e-06
p1=0.239, p2=0.222

```

```
--- Iter [1883/2000] ---
Total Loss: 1388.9720
MSE Component: 1.3841 (Weighted: 1384.0994)
NLL Component: 4.7855
Min Variance: 1.57e-05
p1=0.239, p2=0.222
--- Iter [1884/2000] ---
Total Loss: 2019.7233
MSE Component: 2.0154 (Weighted: 2015.3975)
NLL Component: 4.2385
Min Variance: 7.72e-06
p1=0.239, p2=0.222
--- Iter [1885/2000] ---
Total Loss: 906.6537
MSE Component: 0.9026 (Weighted: 902.6314)
NLL Component: 3.9351
Min Variance: 1.28e-05
p1=0.239, p2=0.222
--- Iter [1886/2000] ---
Total Loss: 1166.7880
MSE Component: 1.1632 (Weighted: 1163.1614)
NLL Component: 3.5394
Min Variance: 9.18e-06
p1=0.239, p2=0.222
--- Iter [1887/2000] ---
Total Loss: 1123.1196
MSE Component: 1.1191 (Weighted: 1119.1489)
NLL Component: 3.8836
Min Variance: 1.83e-06
p1=0.238, p2=0.222
--- Iter [1888/2000] ---
Total Loss: 1073.0170
MSE Component: 1.0696 (Weighted: 1069.5909)
NLL Component: 3.3389
Min Variance: 1.80e-05
p1=0.238, p2=0.222
--- Iter [1889/2000] ---
Total Loss: 1098.5581
MSE Component: 1.0954 (Weighted: 1095.3958)
NLL Component: 3.0752
Min Variance: 1.08e-05
p1=0.238, p2=0.222
--- Iter [1890/2000] ---
Total Loss: 1203.3595
MSE Component: 1.1989 (Weighted: 1198.8841)
NLL Component: 4.3882
Min Variance: 3.17e-05
p1=0.238, p2=0.222
```

```
--- Validation at iteration 1890 ---
  Average MSE: 388.3340, Average ANEES: 71.8241
-----
--- Iter [1891/2000] ---
  Total Loss: 1083.3788
  MSE Component: 1.0799 (Weighted: 1079.9326)
  NLL Component: 3.3590
  Min Variance: 9.08e-06
  p1=0.238, p2=0.222
--- Iter [1892/2000] ---
  Total Loss: 1198.6809
  MSE Component: 1.1945 (Weighted: 1194.5171)
  NLL Component: 4.0767
  Min Variance: 8.14e-06
  p1=0.238, p2=0.222
--- Iter [1893/2000] ---
  Total Loss: 997.7679
  MSE Component: 0.9942 (Weighted: 994.2391)
  NLL Component: 3.4417
  Min Variance: 3.86e-06
  p1=0.238, p2=0.222
--- Iter [1894/2000] ---
  Total Loss: 1027.4850
  MSE Component: 1.0247 (Weighted: 1024.6637)
  NLL Component: 2.7341
  Min Variance: 1.32e-05
  p1=0.238, p2=0.222
--- Iter [1895/2000] ---
  Total Loss: 1157.2833
  MSE Component: 1.1533 (Weighted: 1153.2770)
  NLL Component: 3.9191
  Min Variance: 1.61e-05
  p1=0.238, p2=0.222
--- Iter [1896/2000] ---
  Total Loss: 1158.1589
  MSE Component: 1.1551 (Weighted: 1155.0566)
  NLL Component: 3.0152
  Min Variance: 1.81e-05
  p1=0.238, p2=0.222
--- Iter [1897/2000] ---
  Total Loss: 980.2095
  MSE Component: 0.9762 (Weighted: 976.1607)
  NLL Component: 3.9617
  Min Variance: 1.01e-05
  p1=0.238, p2=0.222
--- Iter [1898/2000] ---
  Total Loss: 971.0460
```

MSE Component: 0.9672 (Weighted: 967.1996)  
NLL Component: 3.7593  
Min Variance: 1.94e-05  
p1=0.238, p2=0.222  
--- Iter [1899/2000] ---  
Total Loss: 820.9693  
MSE Component: 0.8173 (Weighted: 817.2941)  
NLL Component: 3.5881  
Min Variance: 1.63e-05  
p1=0.238, p2=0.222  
--- Iter [1900/2000] ---  
Total Loss: 1139.6146  
MSE Component: 1.1362 (Weighted: 1136.2336)  
NLL Component: 3.2939  
Min Variance: 9.37e-06  
p1=0.238, p2=0.222

--- Validation at iteration 1900 ---  
Average MSE: 396.0742, Average ANEES: 76.4985

---

--- Iter [1901/2000] ---  
Total Loss: 775.3983  
MSE Component: 0.7723 (Weighted: 772.2971)  
NLL Component: 3.0140  
Min Variance: 2.00e-06  
p1=0.238, p2=0.222  
--- Iter [1902/2000] ---  
Total Loss: 1265.5712  
MSE Component: 1.2615 (Weighted: 1261.5393)  
NLL Component: 3.9447  
Min Variance: 1.47e-05  
p1=0.238, p2=0.222  
--- Iter [1903/2000] ---  
Total Loss: 854.1705  
MSE Component: 0.8507 (Weighted: 850.7318)  
NLL Component: 3.3517  
Min Variance: 1.47e-05  
p1=0.238, p2=0.222  
--- Iter [1904/2000] ---  
Total Loss: 885.6108  
MSE Component: 0.8822 (Weighted: 882.1556)  
NLL Component: 3.3682  
Min Variance: 1.23e-05  
p1=0.238, p2=0.222  
--- Iter [1905/2000] ---  
Total Loss: 999.0378  
MSE Component: 0.9957 (Weighted: 995.7383)  
NLL Component: 3.2125

```

Min Variance: 1.75e-05
p1=0.238, p2=0.222
--- Iter [1906/2000] ---
Total Loss: 1141.9373
MSE Component: 1.1386 (Weighted: 1138.5856)
NLL Component: 3.2645
Min Variance: 1.71e-05
p1=0.238, p2=0.222
--- Iter [1907/2000] ---
Total Loss: 1099.3407
MSE Component: 1.0950 (Weighted: 1094.9616)
NLL Component: 4.2919
Min Variance: 8.00e-06
p1=0.238, p2=0.222
--- Iter [1908/2000] ---
Total Loss: 1914.3129
MSE Component: 1.9110 (Weighted: 1911.0321)
NLL Component: 3.1936
Min Variance: 1.48e-05
p1=0.238, p2=0.222
--- Iter [1909/2000] ---
Total Loss: 905.6188
MSE Component: 0.9016 (Weighted: 901.5635)
NLL Component: 3.9682
Min Variance: 1.87e-05
p1=0.238, p2=0.222
--- Iter [1910/2000] ---
Total Loss: 987.6838
MSE Component: 0.9840 (Weighted: 983.9514)
NLL Component: 3.6452
Min Variance: 4.84e-06
p1=0.238, p2=0.222

--- Validation at iteration 1910 ---
Average MSE: 432.6832, Average ANEES: 86.5257
-----
--- Iter [1911/2000] ---
Total Loss: 1240.3096
MSE Component: 1.2373 (Weighted: 1237.2983)
NLL Component: 2.9242
Min Variance: 1.40e-05
p1=0.238, p2=0.222
--- Iter [1912/2000] ---
Total Loss: 1807.1992
MSE Component: 1.8031 (Weighted: 1803.0616)
NLL Component: 4.0504
Min Variance: 2.53e-05
p1=0.238, p2=0.222

```

```
--- Iter [1913/2000] ---
Total Loss: 1349.2831
MSE Component: 1.3461 (Weighted: 1346.1300)
NLL Component: 3.0659
Min Variance: 3.05e-05
p1=0.238, p2=0.221
--- Iter [1914/2000] ---
Total Loss: 954.4639
MSE Component: 0.9516 (Weighted: 951.6499)
NLL Component: 2.7269
Min Variance: 9.26e-06
p1=0.238, p2=0.221
--- Iter [1915/2000] ---
Total Loss: 1184.9628
MSE Component: 1.1818 (Weighted: 1181.7510)
NLL Component: 3.1246
Min Variance: 1.71e-05
p1=0.238, p2=0.221
--- Iter [1916/2000] ---
Total Loss: 1214.2426
MSE Component: 1.2113 (Weighted: 1211.2858)
NLL Component: 2.8695
Min Variance: 7.35e-06
p1=0.238, p2=0.221
--- Iter [1917/2000] ---
Total Loss: 1326.3403
MSE Component: 1.3225 (Weighted: 1322.4658)
NLL Component: 3.7873
Min Variance: 1.89e-05
p1=0.238, p2=0.221
--- Iter [1918/2000] ---
Total Loss: 1116.4489
MSE Component: 1.1130 (Weighted: 1112.9667)
NLL Component: 3.3950
Min Variance: 1.89e-05
p1=0.238, p2=0.221
--- Iter [1919/2000] ---
Total Loss: 799.6514
MSE Component: 0.7956 (Weighted: 795.5891)
NLL Component: 3.9752
Min Variance: 1.47e-05
p1=0.238, p2=0.221
--- Iter [1920/2000] ---
Total Loss: 801.5750
MSE Component: 0.7978 (Weighted: 797.7996)
NLL Component: 3.6883
Min Variance: 2.41e-05
p1=0.238, p2=0.221
```

```
--- Validation at iteration 1920 ---
  Average MSE: 348.1399, Average ANEES: 82.3652
-----
--- Iter [1921/2000] ---
  Total Loss: 983.5858
  MSE Component: 0.9801 (Weighted: 980.1475)
  NLL Component: 3.3512
  Min Variance: 9.31e-06
  p1=0.238, p2=0.221
--- Iter [1922/2000] ---
  Total Loss: 1255.6180
  MSE Component: 1.2518 (Weighted: 1251.8207)
  NLL Component: 3.7102
  Min Variance: 2.20e-05
  p1=0.238, p2=0.221
--- Iter [1923/2000] ---
  Total Loss: 983.2918
  MSE Component: 0.9811 (Weighted: 981.1301)
  NLL Component: 2.0746
  Min Variance: 2.23e-05
  p1=0.238, p2=0.221
--- Iter [1924/2000] ---
  Total Loss: 1196.9138
  MSE Component: 1.1934 (Weighted: 1193.4135)
  NLL Component: 3.4133
  Min Variance: 2.60e-05
  p1=0.238, p2=0.221
--- Iter [1925/2000] ---
  Total Loss: 910.8536
  MSE Component: 0.9067 (Weighted: 906.7394)
  NLL Component: 4.0271
  Min Variance: 1.84e-05
  p1=0.238, p2=0.221
--- Iter [1926/2000] ---
  Total Loss: 844.8615
  MSE Component: 0.8419 (Weighted: 841.8601)
  NLL Component: 2.9143
  Min Variance: 1.61e-05
  p1=0.238, p2=0.221
--- Iter [1927/2000] ---
  Total Loss: 833.5291
  MSE Component: 0.8303 (Weighted: 830.3180)
  NLL Component: 3.1239
  Min Variance: 1.05e-05
  p1=0.238, p2=0.221
--- Iter [1928/2000] ---
  Total Loss: 869.1215
```

MSE Component: 0.8653 (Weighted: 865.2800)  
NLL Component: 3.7543  
Min Variance: 7.17e-06  
p1=0.238, p2=0.221  
--- Iter [1929/2000] ---  
Total Loss: 1108.0027  
MSE Component: 1.1049 (Weighted: 1104.9104)  
NLL Component: 3.0051  
Min Variance: 1.33e-05  
p1=0.238, p2=0.221  
--- Iter [1930/2000] ---  
Total Loss: 1246.6638  
MSE Component: 1.2431 (Weighted: 1243.1048)  
NLL Component: 3.4718  
Min Variance: 8.04e-06  
p1=0.238, p2=0.221  
  
--- Validation at iteration 1930 ---  
Average MSE: 369.5567, Average ANEES: 95.4652

---

--- Iter [1931/2000] ---  
Total Loss: 1477.6143  
MSE Component: 1.4731 (Weighted: 1473.0688)  
NLL Component: 4.4583  
Min Variance: 1.26e-05  
p1=0.238, p2=0.221  
--- Iter [1932/2000] ---  
Total Loss: 1108.0046  
MSE Component: 1.1046 (Weighted: 1104.6170)  
NLL Component: 3.3005  
Min Variance: 1.13e-05  
p1=0.238, p2=0.221  
--- Iter [1933/2000] ---  
Total Loss: 1175.1456  
MSE Component: 1.1702 (Weighted: 1170.1864)  
NLL Component: 4.8721  
Min Variance: 1.59e-05  
p1=0.238, p2=0.221  
--- Iter [1934/2000] ---  
Total Loss: 1003.1777  
MSE Component: 0.9997 (Weighted: 999.7025)  
NLL Component: 3.3882  
Min Variance: 2.23e-05  
p1=0.238, p2=0.221  
--- Iter [1935/2000] ---  
Total Loss: 897.2025  
MSE Component: 0.8942 (Weighted: 894.2228)  
NLL Component: 2.8926

```

Min Variance: 1.53e-05
p1=0.238, p2=0.221
--- Iter [1936/2000] ---
Total Loss: 828.2228
MSE Component: 0.8256 (Weighted: 825.6339)
NLL Component: 2.5018
Min Variance: 1.06e-05
p1=0.238, p2=0.221
--- Iter [1937/2000] ---
Total Loss: 1003.2429
MSE Component: 1.0000 (Weighted: 1000.0261)
NLL Component: 3.1297
Min Variance: 1.76e-05
p1=0.238, p2=0.221
--- Iter [1938/2000] ---
Total Loss: 874.4169
MSE Component: 0.8713 (Weighted: 871.3234)
NLL Component: 3.0063
Min Variance: 1.05e-05
p1=0.238, p2=0.221
--- Iter [1939/2000] ---
Total Loss: 788.7725
MSE Component: 0.7854 (Weighted: 785.3513)
NLL Component: 3.3341
Min Variance: 1.55e-05
p1=0.238, p2=0.221
--- Iter [1940/2000] ---
Total Loss: 927.8661
MSE Component: 0.9246 (Weighted: 924.6448)
NLL Component: 3.1343
Min Variance: 8.34e-06
p1=0.238, p2=0.221

--- Validation at iteration 1940 ---
Average MSE: 331.3683, Average ANEES: 81.2596
-----
--- Iter [1941/2000] ---
Total Loss: 917.3598
MSE Component: 0.9140 (Weighted: 913.9886)
NLL Component: 3.2841
Min Variance: 8.39e-06
p1=0.238, p2=0.221
--- Iter [1942/2000] ---
Total Loss: 1649.4175
MSE Component: 1.6461 (Weighted: 1646.1332)
NLL Component: 3.1971
Min Variance: 1.35e-05
p1=0.238, p2=0.221

```

```
--- Iter [1943/2000] ---
Total Loss: 1335.9573
MSE Component: 1.3321 (Weighted: 1332.0518)
NLL Component: 3.8183
Min Variance: 1.42e-05
p1=0.238, p2=0.221
--- Iter [1944/2000] ---
Total Loss: 1409.5266
MSE Component: 1.4057 (Weighted: 1405.6615)
NLL Component: 3.7781
Min Variance: 7.15e-06
p1=0.238, p2=0.221
--- Iter [1945/2000] ---
Total Loss: 1314.6945
MSE Component: 1.3109 (Weighted: 1310.8535)
NLL Component: 3.7539
Min Variance: 1.54e-05
p1=0.238, p2=0.221
--- Iter [1946/2000] ---
Total Loss: 1204.1564
MSE Component: 1.2010 (Weighted: 1201.0388)
NLL Component: 3.0305
Min Variance: 1.24e-05
p1=0.237, p2=0.221
--- Iter [1947/2000] ---
Total Loss: 1174.2725
MSE Component: 1.1705 (Weighted: 1170.5256)
NLL Component: 3.6600
Min Variance: 6.83e-06
p1=0.237, p2=0.221
--- Iter [1948/2000] ---
Total Loss: 1019.8493
MSE Component: 1.0161 (Weighted: 1016.1057)
NLL Component: 3.6566
Min Variance: 5.86e-06
p1=0.237, p2=0.221
--- Iter [1949/2000] ---
Total Loss: 951.6790
MSE Component: 0.9485 (Weighted: 948.5293)
NLL Component: 3.0625
Min Variance: 1.06e-05
p1=0.237, p2=0.221
--- Iter [1950/2000] ---
Total Loss: 984.7791
MSE Component: 0.9819 (Weighted: 981.9471)
NLL Component: 2.7449
Min Variance: 4.37e-05
p1=0.237, p2=0.221
```

```
--- Validation at iteration 1950 ---
  Average MSE: 368.2911, Average ANEES: 111.2461
-----
--- Iter [1951/2000] ---
  Total Loss: 2324.6687
  MSE Component: 2.3213 (Weighted: 2321.3177)
  NLL Component: 3.2639
  Min Variance: 1.33e-05
  p1=0.237, p2=0.221
--- Iter [1952/2000] ---
  Total Loss: 1077.4701
  MSE Component: 1.0742 (Weighted: 1074.2209)
  NLL Component: 3.1622
  Min Variance: 6.55e-06
  p1=0.237, p2=0.221
--- Iter [1953/2000] ---
  Total Loss: 1944.8417
  MSE Component: 1.9409 (Weighted: 1940.9487)
  NLL Component: 3.8059
  Min Variance: 2.35e-05
  p1=0.237, p2=0.221
--- Iter [1954/2000] ---
  Total Loss: 1927.5471
  MSE Component: 1.9247 (Weighted: 1924.6855)
  NLL Component: 2.7746
  Min Variance: 1.25e-05
  p1=0.237, p2=0.221
--- Iter [1955/2000] ---
  Total Loss: 963.6627
  MSE Component: 0.9601 (Weighted: 960.1397)
  NLL Component: 3.4358
  Min Variance: 3.91e-06
  p1=0.237, p2=0.221
--- Iter [1956/2000] ---
  Total Loss: 991.3403
  MSE Component: 0.9881 (Weighted: 988.1439)
  NLL Component: 3.1093
  Min Variance: 9.12e-06
  p1=0.237, p2=0.221
--- Iter [1957/2000] ---
  Total Loss: 1046.5956
  MSE Component: 1.0427 (Weighted: 1042.7165)
  NLL Component: 3.7920
  Min Variance: 5.00e-06
  p1=0.237, p2=0.221
--- Iter [1958/2000] ---
  Total Loss: 1078.8984
```

MSE Component: 1.0749 (Weighted: 1074.9030)  
NLL Component: 3.9084  
Min Variance: 8.20e-06  
p1=0.237, p2=0.221  
--- Iter [1959/2000] ---  
Total Loss: 1265.6489  
MSE Component: 1.2622 (Weighted: 1262.1903)  
NLL Component: 3.3716  
Min Variance: 2.15e-05  
p1=0.237, p2=0.221  
--- Iter [1960/2000] ---  
Total Loss: 1429.6895  
MSE Component: 1.4264 (Weighted: 1426.3561)  
NLL Component: 3.2463  
Min Variance: 7.51e-06  
p1=0.237, p2=0.221

--- Validation at iteration 1960 ---  
Average MSE: 339.1074, Average ANEES: 155.2729

---

--- Iter [1961/2000] ---  
Total Loss: 1314.0889  
MSE Component: 1.3114 (Weighted: 1311.3749)  
NLL Component: 2.6269  
Min Variance: 1.10e-05  
p1=0.237, p2=0.221  
--- Iter [1962/2000] ---  
Total Loss: 1327.2827  
MSE Component: 1.3237 (Weighted: 1323.6599)  
NLL Component: 3.5357  
Min Variance: 2.27e-05  
p1=0.237, p2=0.221  
--- Iter [1963/2000] ---  
Total Loss: 1102.8303  
MSE Component: 1.1001 (Weighted: 1100.0766)  
NLL Component: 2.6668  
Min Variance: 1.18e-05  
p1=0.237, p2=0.221  
--- Iter [1964/2000] ---  
Total Loss: 1307.9207  
MSE Component: 1.3052 (Weighted: 1305.1932)  
NLL Component: 2.6404  
Min Variance: 1.75e-05  
p1=0.237, p2=0.221  
--- Iter [1965/2000] ---  
Total Loss: 1124.4819  
MSE Component: 1.1220 (Weighted: 1122.0325)  
NLL Component: 2.3624

```

Min Variance: 1.69e-05
p1=0.237, p2=0.221
--- Iter [1966/2000] ---
Total Loss: 1434.2888
MSE Component: 1.4304 (Weighted: 1430.4353)
NLL Component: 3.7665
Min Variance: 5.62e-06
p1=0.237, p2=0.221
--- Iter [1967/2000] ---
Total Loss: 1030.0287
MSE Component: 1.0267 (Weighted: 1026.6826)
NLL Component: 3.2590
Min Variance: 4.99e-06
p1=0.237, p2=0.221
--- Iter [1968/2000] ---
Total Loss: 915.2432
MSE Component: 0.9113 (Weighted: 911.3151)
NLL Component: 3.8410
Min Variance: 1.56e-05
p1=0.237, p2=0.221
--- Iter [1969/2000] ---
Total Loss: 758.8259
MSE Component: 0.7554 (Weighted: 755.3984)
NLL Component: 3.3404
Min Variance: 1.07e-05
p1=0.237, p2=0.221
--- Iter [1970/2000] ---
Total Loss: 1160.1354
MSE Component: 1.1561 (Weighted: 1156.0903)
NLL Component: 3.9581
Min Variance: 1.88e-06
p1=0.237, p2=0.221

--- Validation at iteration 1970 ---
Average MSE: 371.6355, Average ANEES: 81.9985
-----
--- Iter [1971/2000] ---
Total Loss: 1081.6810
MSE Component: 1.0781 (Weighted: 1078.0858)
NLL Component: 3.5082
Min Variance: 1.11e-05
p1=0.237, p2=0.221
--- Iter [1972/2000] ---
Total Loss: 1383.6200
MSE Component: 1.3801 (Weighted: 1380.0534)
NLL Component: 3.4796
Min Variance: 1.44e-05
p1=0.237, p2=0.221

```

```
--- Iter [1973/2000] ---
Total Loss: 1389.8970
MSE Component: 1.3862 (Weighted: 1386.2233)
NLL Component: 3.5866
Min Variance: 7.68e-06
p1=0.237, p2=0.221
--- Iter [1974/2000] ---
Total Loss: 2187.2869
MSE Component: 2.1843 (Weighted: 2184.2687)
NLL Component: 2.9308
Min Variance: 1.50e-05
p1=0.237, p2=0.221
--- Iter [1975/2000] ---
Total Loss: 1160.8928
MSE Component: 1.1570 (Weighted: 1157.0188)
NLL Component: 3.7870
Min Variance: 1.27e-05
p1=0.237, p2=0.221
--- Iter [1976/2000] ---
Total Loss: 1112.0619
MSE Component: 1.1089 (Weighted: 1108.8771)
NLL Component: 3.0977
Min Variance: 9.79e-06
p1=0.237, p2=0.221
--- Iter [1977/2000] ---
Total Loss: 963.8688
MSE Component: 0.9607 (Weighted: 960.7404)
NLL Component: 3.0413
Min Variance: 6.48e-06
p1=0.237, p2=0.221
--- Iter [1978/2000] ---
Total Loss: 831.3459
MSE Component: 0.8269 (Weighted: 826.9329)
NLL Component: 4.3259
Min Variance: 7.49e-06
p1=0.237, p2=0.221
--- Iter [1979/2000] ---
Total Loss: 1196.7550
MSE Component: 1.1939 (Weighted: 1193.8604)
NLL Component: 2.8076
Min Variance: 1.03e-05
p1=0.237, p2=0.221
--- Iter [1980/2000] ---
Total Loss: 3164.7891
MSE Component: 3.1623 (Weighted: 3162.3363)
NLL Component: 2.3654
Min Variance: 3.35e-06
p1=0.237, p2=0.221
```

```
--- Validation at iteration 1980 ---
  Average MSE: 424.1296, Average ANEES: 76.3768
-----
--- Iter [1981/2000] ---
  Total Loss: 2459.4250
  MSE Component: 2.4562 (Weighted: 2456.1656)
  NLL Component: 3.1724
  Min Variance: 5.29e-06
  p1=0.237, p2=0.221
--- Iter [1982/2000] ---
  Total Loss: 3311.4495
  MSE Component: 3.3085 (Weighted: 3308.5096)
  NLL Component: 2.8528
  Min Variance: 1.12e-05
  p1=0.237, p2=0.221
--- Iter [1983/2000] ---
  Total Loss: 2050.9875
  MSE Component: 2.0480 (Weighted: 2048.0165)
  NLL Component: 2.8838
  Min Variance: 9.59e-06
  p1=0.237, p2=0.221
--- Iter [1984/2000] ---
  Total Loss: 1311.6992
  MSE Component: 1.3085 (Weighted: 1308.4908)
  NLL Component: 3.1215
  Min Variance: 1.88e-05
  p1=0.237, p2=0.221
--- Iter [1985/2000] ---
  Total Loss: 1861.6210
  MSE Component: 1.8588 (Weighted: 1858.8153)
  NLL Component: 2.7186
  Min Variance: 1.91e-05
  p1=0.237, p2=0.221
--- Iter [1986/2000] ---
  Total Loss: 1558.5282
  MSE Component: 1.5551 (Weighted: 1555.0761)
  NLL Component: 3.3650
  Min Variance: 1.31e-05
  p1=0.237, p2=0.221
--- Iter [1987/2000] ---
  Total Loss: 1567.7788
  MSE Component: 1.5637 (Weighted: 1563.6967)
  NLL Component: 3.9950
  Min Variance: 1.37e-05
  p1=0.237, p2=0.221
--- Iter [1988/2000] ---
  Total Loss: 1419.5430
```

MSE Component: 1.4160 (Weighted: 1416.0075)  
NLL Component: 3.4484  
Min Variance: 2.28e-05  
p1=0.237, p2=0.221  
--- Iter [1989/2000] ---  
Total Loss: 2187.7185  
MSE Component: 2.1836 (Weighted: 2183.6405)  
NLL Component: 3.9909  
Min Variance: 1.39e-05  
p1=0.237, p2=0.221  
--- Iter [1990/2000] ---  
Total Loss: 3004.2031  
MSE Component: 3.0007 (Weighted: 3000.7224)  
NLL Component: 3.3936  
Min Variance: 8.10e-06  
p1=0.237, p2=0.221

--- Validation at iteration 1990 ---  
Average MSE: 323.5101, Average ANEES: 97.6126

---

--- Iter [1991/2000] ---  
Total Loss: 2719.2644  
MSE Component: 2.7151 (Weighted: 2715.0972)  
NLL Component: 4.0802  
Min Variance: 7.05e-06  
p1=0.237, p2=0.221  
--- Iter [1992/2000] ---  
Total Loss: 5504.5186  
MSE Component: 5.4993 (Weighted: 5499.2638)  
NLL Component: 5.1681  
Min Variance: 7.87e-06  
p1=0.237, p2=0.221  
--- Iter [1993/2000] ---  
Total Loss: 3226.7988  
MSE Component: 3.2221 (Weighted: 3222.1119)  
NLL Component: 4.5996  
Min Variance: 1.23e-05  
p1=0.237, p2=0.221  
--- Iter [1994/2000] ---  
Total Loss: 3456.8376  
MSE Component: 3.4527 (Weighted: 3452.6725)  
NLL Component: 4.0780  
Min Variance: 6.31e-06  
p1=0.237, p2=0.221  
--- Iter [1995/2000] ---  
Total Loss: 2866.5403  
MSE Component: 2.8619 (Weighted: 2861.8677)  
NLL Component: 4.5855

```

Min Variance: 1.06e-05
p1=0.237, p2=0.221
--- Iter [1996/2000] ---
Total Loss: 2927.7107
MSE Component: 2.9231 (Weighted: 2923.0971)
NLL Component: 4.5264
Min Variance: 1.51e-05
p1=0.237, p2=0.221
--- Iter [1997/2000] ---
Total Loss: 2171.6604
MSE Component: 2.1682 (Weighted: 2168.1819)
NLL Component: 3.3914
Min Variance: 5.81e-06
p1=0.237, p2=0.221
--- Iter [1998/2000] ---
Total Loss: 1660.1429
MSE Component: 1.6578 (Weighted: 1657.8364)
NLL Component: 2.2195
Min Variance: 2.61e-05
p1=0.237, p2=0.221
--- Iter [1999/2000] ---
Total Loss: 1230.8456
MSE Component: 1.2273 (Weighted: 1227.3430)
NLL Component: 3.4155
Min Variance: 1.35e-05
p1=0.237, p2=0.221
--- Iter [2000/2000] ---
Total Loss: 1267.7500
MSE Component: 1.2652 (Weighted: 1265.2445)
NLL Component: 2.4185
Min Variance: 1.77e-05
p1=0.237, p2=0.221

--- Validation at iteration 2000 ---
Average MSE: 488.4022, Average ANEES: 60.4988
>>> New best VALIDATION ANEES! Saving model. <<<
-----
```

Training completed.  
Loading best model from iteration 2000 with ANEES 60.4988

```
[8]: {'best_val_anees': 60.49876022338867,
      'best_val_nll': 0.0,
      'best_val_mse': 488.4022216796875,
      'best_iter': 2000,
      'final_model': StateBayesianKalmanNet(
          (dnn): DNN_BayesianKalmanNet(
```

```

        (input_layer): Sequential(
            (0): Linear(in_features=16, out_features=640, bias=True)
            (1): ReLU()
        )
        (concrete_dropout1): ConcreteDropout()
        (gru): GRU(640, 128)
        (output_layer): Sequential(
            (0): Linear(in_features=128, out_features=64, bias=True)
            (1): ReLU()
            (2): Linear(in_features=64, out_features=16, bias=True)
        )
        (concrete_dropout2): ConcreteDropout()
    )
)
}

```

```

[ ]: if False:
    import torch
    import os

    # Protože jsi trénink přerušil, nemáme slovník s metrikami automaticky.
    # Musíme uložit přímo model 'state_knet'.

    # 1. Definuj cestu (Metriky si do názvu musíš dopsat ručně podle toho, co
    ↪jsi viděl v logu naposledy,
    # nebo použij obecný název, abys o model nepřišel).
    save_path = 'best_MSE_BayesianKalmanNet_linear_trajectory-MSE2.3662|ANES7.
    ↪9216.pth'

    # Pokud si pamatuješ hodnoty z logu (např. ANEES 23.5), můžeš je tam dopsat
    ↪ručně:
    # save_path = 'best_kalmanet_nclt_sensor_fusion_ANEES23.57_MSE8.
    ↪17_interrupted.pth'

    # 2. Uložení
    # DŮLEŽITÉ: Voláme .state_dict() přímo na objektu state_knet (nebo
    ↪trained_knet, pokud jsi ho přiřadil)
    # Nepoužíváme závorky ['final_model'], protože state_knet UŽ JE ten model.
    torch.save(state_knet.state_dict(), save_path)

    print(f"\n Záchrana modelu úspěšná! Uloženo do: {save_path}")

if False:
    import os
    # trained_knet = state_knet
    # Přístup k metrikám ve slovníku je správně (přes závorky [])
    print(f"    -> Best ANEES: {trained_knet['best_val_anees']:.4f}")
    print(f"    -> Best MSE:   {trained_knet['best_val_mse']:.4f}")

```

```

    save_path =_
    ↪f'best_kalmanFormer_nclt_sensor_fusion_ANEES{trained_knet["best_val_anees"]:.4f}_MSE{trained_knet["best_val_mse"]:.4f}_nejlepsi_test_vysledky.pth'

    # OPRAVA: Musíš vytáhnout model ze slovníku pomocí klíče 'final_model'
    # A teprve na něm zavolat .state_dict()
    torch.save(trained_knet['final_model'].state_dict(), save_path)

    print(f"\n Model úspěšně uložen do: {save_path}")

```

Záchrana modelu úspěšná! Uloženo do:  
 best\_MSE\_BayesianKalmanNet\_linear\_trajectory-MSE2.3662|ANEES7.9216.pth

```

[10]: import torch
import torch.nn.functional as F
import numpy as np
import Filters
from utils import utils

# =====
# O. KONFIGURACE A PRÍPRAVA MODELŮ
# =====
# Parametry pro Bayesovskou inferenci
J_SAMPLES_TEST = 20          # Počet vzorků pro Ensemble

try:
    trained_model_bkn = state_knet
    # DŮLEŽITÉ: Necháme model v módu .train(), aby fungoval Dropout pro Ensemble
    trained_model_bkn.train()

    print(f"INFO: BayesianKalmanNet připraven (Ensemble size={J_SAMPLES_TEST},"
    ↪BEZ Noise Floor).")
except NameError:
    raise NameError("Chyba: Proměnná 'state_knet' neexistuje. Spusťte nejprve"
    ↪trénink.")

# Inicializace klasických filtrov
print("Inicializuji EKF, UKF, PF, AKF...")
ekf_filter = Filters.ExtendedKalmanFilter(sys_model)
ukf_filter = Filters.UnscentedKalmanFilter(sys_model)
pf_filter = Filters.ParticleFilter(sys_model, num_particles=10000)
akf_filter = Filters.AdaptiveKalmanFilter(sys_model, mdm_L=4, mdm_version=1)
kf_filter = Filters.KalmanFilter(sys_model)

# =====
# 1. VYHODNOCOVACÍ SMYČKA

```

```

# =====
# Seznamy pro ukládání výsledků
mse_knet, anees_knet = [], []
mse_ekf, anees_ekf = [], []
mse_ukf, anees_ukf = [], []
mse_pf, anees_pf = [], []
mse_akf, anees_akf = [], []
mse_kf, anees_kf = [], []

# Počítadla
traj_idx = 0
total_trajectories = len(test_loader.dataset)

print(f"\nVyhodnocuji {total_trajectories} sekvencí z testovací sady...")

with torch.no_grad():
    for x_true_batch, y_meas_batch in test_loader:

        batch_size = x_true_batch.shape[0]

        for i in range(batch_size):
            traj_idx += 1

            # Příprava dat pro jednu trajektorii
            y_seq = y_meas_batch[i].to(device)      # [Seq_Len, Obs_Dim]
            x_true = x_true_batch[i].to(device)      # [Seq_Len, State_Dim]
            seq_len = y_seq.shape[0]

            # --- PŘÍPRAVA POČÁTEČNÍHO STAVU ---
            knet_init_state = x_true[0, :].unsqueeze(0) # [1, Dim]
            filter_init_state = x_true[0, :].unsqueeze(1) # [Dim, 1]

            # =====
            # A. Bayesian KalmanNet (Ensemble Inference)
            # =====
            ensemble_preds = []

            # 1. Generování J trajektorií (Monte Carlo)
            for j in range(J_SAMPLES_TEST):
                trained_model_bkn.reset(batch_size=1,
                ↪initial_state=knet_init_state)

                # Uložíme predikce pro tento sample
                sample_seq = [knet_init_state]

                for t in range(1, seq_len):
                    y_t = y_seq[t, :].unsqueeze(0)

```

```

# U BKN step vraci (x, reg), reg nás při testu nezajímá
x_val, _ = trained_model_bkn.step(y_t)
sample_seq.append(x_val)

# Spojíme do [Seq_Len, State_Dim]
ensemble_preds.append(torch.cat(sample_seq, dim=0))

# 2. Statistiky Ensemble (Mean & Variance)
# Shape: [J, Seq_Len, State_Dim]
ensemble_tensor = torch.stack(ensemble_preds, dim=0)

# Průměrná trajektorie (Očekávaná hodnota)
full_x_hat_knet = ensemble_tensor.mean(dim=0)

# Variace modelu (Epistemická nejistota)
# ZDE JE ZMĚNA: Žádný sensor_noise_floor, bereme čistý rozptyl sítě
total_var = ensemble_tensor.var(dim=0)

# Konstrukce plné kovarianční matice P (Diagonal)
# ANEES vyžaduje [Seq_Len, State_Dim, State_Dim]
full_P_hat_knet = torch.zeros(seq_len, m, m, device=device)
for t_step in range(seq_len):
    # Přidáme malé epsilon pro numerickou stabilitu, kdyby byl rozptyl 0
    full_P_hat_knet[t_step] = torch.diag(total_var[t_step] + 1e-9)

# =====
# B. Klasické Filtry
# =====

# Adaptive KF
akf_m_res, _, _ = akf_filter.process_sequence_adaptively(y_seq)
full_x_hat_akf = akf_m_res['x_filtered']
full_P_hat_akf = akf_m_res['P_filtered']

# EKF
ekf_res = ekf_filter.process_sequence(y_seq, Ex0=filter_init_state, P0=sys_model.P0)
full_x_hat_ekf = ekf_res['x_filtered']
full_P_hat_ekf = ekf_res['P_filtered']

# UKF
ukf_res = ukf_filter.process_sequence(y_seq, Ex0=filter_init_state, P0=sys_model.P0)
full_x_hat_ukf = ukf_res['x_filtered']
full_P_hat_ukf = ukf_res['P_filtered']

```

```

# PF
pf_res = pf_filter.process_sequence(y_seq, Ex0=filter_init_state, ↵
P0=sys_model.P0)
full_x_hat_pf = pf_res['x_filtered']
full_P_hat_pf = pf_res['P_filtered']

# Standard KF
kf_res = kf_filter.process_sequence(y_seq, Ex0=filter_init_state, ↵
P0=sys_model.P0)
full_x_hat_kf = kf_res['x_filtered']
full_P_hat_kf = kf_res['P_filtered']

# =====
# C. Metriky
# =====
# 1. MSE
mse_knet.append(F.mse_loss(full_x_hat_knet[1:], x_true[1:]).item())
mse_ekf.append(F.mse_loss(full_x_hat_ekf[1:], x_true[1:]).item())
mse_ukf.append(F.mse_loss(full_x_hat_ukf[1:], x_true[1:]).item())
mse_pf.append(F.mse_loss(full_x_hat_pf[1:], x_true[1:]).item())
mse_akf.append(F.mse_loss(full_x_hat_akf[1:], x_true[1:]).item())
mse_kf.append(F.mse_loss(full_x_hat_kf[1:], x_true[1:]).item())

# 2. ANEES
def calc_anees_traj(x_true_seq, x_hat_seq, P_hat_seq):
    return utils.calculate_anees_vectorized(
        x_true_seq.unsqueeze(0).cpu(),
        x_hat_seq.unsqueeze(0).cpu(),
        P_hat_seq.unsqueeze(0).cpu()
    )

    anees_knet.append(calc_anees_traj(x_true, full_x_hat_knet, ↵
full_P_hat_knet))
    anees_ekf.append(calc_anees_traj(x_true, full_x_hat_ekf, ↵
full_P_hat_ekf))
    anees_ukf.append(calc_anees_traj(x_true, full_x_hat_ukf, ↵
full_P_hat_ukf))
    anees_pf.append(calc_anees_traj(x_true, full_x_hat_pf, ↵
full_P_hat_pf))
    anees_akf.append(calc_anees_traj(x_true, full_x_hat_akf, ↵
full_P_hat_akf))
    anees_kf.append(calc_anees_traj(x_true, full_x_hat_kf, ↵
full_P_hat_kf))

    if traj_idx % 20 == 0:
        print(f"  → Zpracováno {traj_idx}/{total_trajectories}")

```

```

# =====
# 2. FINÁLNÍ VÝPIS
# =====
def avg(lst): return np.mean(lst) if len(lst) > 0 else 0.0

state_dim = sys_model.state_dim

print("\n" + "="*90)
print(f"FINÁLNÍ VÝSLEDKY: BAYESIAN KALMANNET (PURE EPISTEMIC) vs CLASSIC"
      " FILTERS")
print("="*90)
print(f"[{'Model':<35} | {'Průměrné MSE':<20} | {'Průměrný ANEES':<20}]")
print("-" * 90)
print(f"Cílové ANEES {state_dim:.2f}")
print("-" * 90)

print(f"[{'Bayesian KalmanNet (Ensemble)':<35} | {avg(mse_knet):<20.4f} | "
      " {avg(anees_knet):<20.4f}]")
print(f"[{'Adaptive KF':<35} | {avg(mse_akyf):<20.4f} | {avg(anees_akyf):<20.4f}]")
print(f"[{'Extended KF (EKF)':<35} | {avg(mse_ekf):<20.4f} | {avg(anees_ekf):<20."
      " 4f}]")
print(f"[{'Unscented KF (UKF)':<35} | {avg(mse_ukf):<20.4f} | {avg(anees_ukf):"
      " <20.4f}]")
print(f"[{'Standard KF (Ideal Baseline)':<35} | {avg(mse_kf):<20.4f} | "
      " {avg(anees_kf):<20.4f}]")
print(f"[{'Particle Filter':<35} | {avg(mse_pf):<20.4f} | {avg(anees_pf):<20."
      " 4f}]")
print("="*90)

```

INFO: BayesianKalmanNet připraven (Ensemble size=20, BEZ Noise Floor).  
 Inicializuje EKF, UKF, PF, AKF...

Vyhodnocuji 1 sekvenci z testovací sady...

Spouštím MDM odhad Q a R...

MDM odhad dokončen.

Odhadnuté Q:

```

[[ 4.13064070e-01 -4.24937501e-02 -5.86073509e-02  1.48873742e-02]
 [-4.24937501e-02  2.73768306e-02  1.39817027e-02 -6.98700785e-05]
 [-5.86073509e-02  1.39817027e-02  3.34790303e-01 -3.45426741e-02]
 [ 1.48873742e-02 -6.98700785e-05 -3.45426741e-02  2.28525577e-02]]

```

Odhadnuté R:

```

[[-1.46430036e-01  1.51903669e-02  2.63280698e-02 -6.06997575e-03]
 [ 1.51903669e-02  1.79104244e-02  1.22167787e-04 -7.55524608e-03]
 [ 2.63280698e-02  1.22167787e-04 -1.19015472e-01  1.38572726e-02]
 [-6.06997575e-03 -7.55524608e-03  1.38572726e-02  1.32357773e-02]]

```

Matice Q a R v Kalmanově filtru byly aktualizovány.

=====		
=====		
=====		
Model	Průměrné MSE	Průměrný ANEES
=====		
Cílové ANEES	4.00	
=====		
Bayesian KalmanNet (Ensemble)	2.3662	7.9216
Adaptive KF	1617.5468	1300.6028
Extended KF (EKF)	9.1898	23.4747
Unscented KF (UKF)	9.1898	23.4745
Standard KF (Ideal Baseline)	9.1898	23.4747
Particle Filter	16.6435	246.7317
=====		
=====		

```
[ ]: import matplotlib.pyplot as plt

# === VIZUALIZACE POSLEDNÍ TESTOVACÍ TRAJEKTORIE ===

# 1. Převod tenzorů na NumPy pole (pro vykreslování)
# Bereme data z poslední iterace předchozí smyčky
gt_np = x_true.cpu().numpy()
knet_np = full_x_hat_knet.cpu().numpy()
ekf_np = full_x_hat_ekf.cpu().numpy()
# (Pokud chceš i UKF, odkomentuj:)
ukf_np = full_x_hat_ukf.cpu().numpy()

# Časová osa (kroky)
time_steps = np.arange(gt_np.shape[0])

# Připomínka indexů (Author's format):
# 0: Pos X, 1: Vel X, 2: Pos Y, 3: Vel Y
idx_px, idx_vx, idx_py, idx_vy = 0, 1, 2, 3

# === GRAF 1: 2D TRAJEKTORIE (MAPA) ===
plt.figure(figsize=(10, 8))
plt.title(f"Porovnání odhadu trajektorie (Testovací sekvence č. {traj_idx})", fontsize=14)

# Ground Truth
```

```

plt.plot(gt_np[:, idx_px], gt_np[:, idx_py], 'k-', linewidth=2, label='Ground\u20ac\u20acTruth (GT)', alpha=0.8)

# EKF
plt.plot(ekf_np[:, idx_px], ekf_np[:, idx_py], 'r--', linewidth=1.5, label='EKF\u20ac\u20ac(Standard)')

# KalmanNet
plt.plot(knet_np[:, idx_px], knet_np[:, idx_py], 'b-.', linewidth=2, label='KalmanNet (Trained)')

# (Volitelné UKF)
plt.plot(ukf_np[:, idx_px], ukf_np[:, idx_py], 'g:', linewidth=1.5, label='UKF', alpha=0.7)

# Start a Cíl
plt.plot(gt_np[0, idx_px], gt_np[0, idx_py], 'ko', markersize=8, label='Start')
plt.plot(gt_np[-1, idx_px], gt_np[-1, idx_py], 'kx', markersize=8, label='Cíl')

plt.xlabel("Pozice X [m]")
plt.ylabel("Pozice Y [m]")
plt.legend()
plt.grid(True)
plt.axis('equal') # Aby mapa nebyla deformovaná
plt.show()

# === GRAF 2: DETAILNÍ PRŮBĚHY STAVŮ ===
fig, axs = plt.subplots(2, 2, figsize=(15, 10))
fig.suptitle("Detailní průběh stavů v čase", fontsize=16)

# --- Pozice X ---
axs[0, 0].plot(time_steps, gt_np[:, idx_px], 'k-', label='GT')
axs[0, 0].plot(time_steps, ekf_np[:, idx_px], 'r--', label='EKF')
axs[0, 0].plot(time_steps, knet_np[:, idx_px], 'b-.', label='KalmanNet')
axs[0, 0].set_title("Pozice X")
axs[0, 0].set_ylabel("Metry")
axs[0, 0].grid(True)
axs[0, 0].legend()

# --- Pozice Y ---
axs[0, 1].plot(time_steps, gt_np[:, idx_py], 'k-', label='GT')
axs[0, 1].plot(time_steps, ekf_np[:, idx_py], 'r--', label='EKF')
axs[0, 1].plot(time_steps, knet_np[:, idx_py], 'b-.', label='KalmanNet')
axs[0, 1].set_title("Pozice Y")
axs[0, 1].set_ylabel("Metry")
axs[0, 1].grid(True)

```

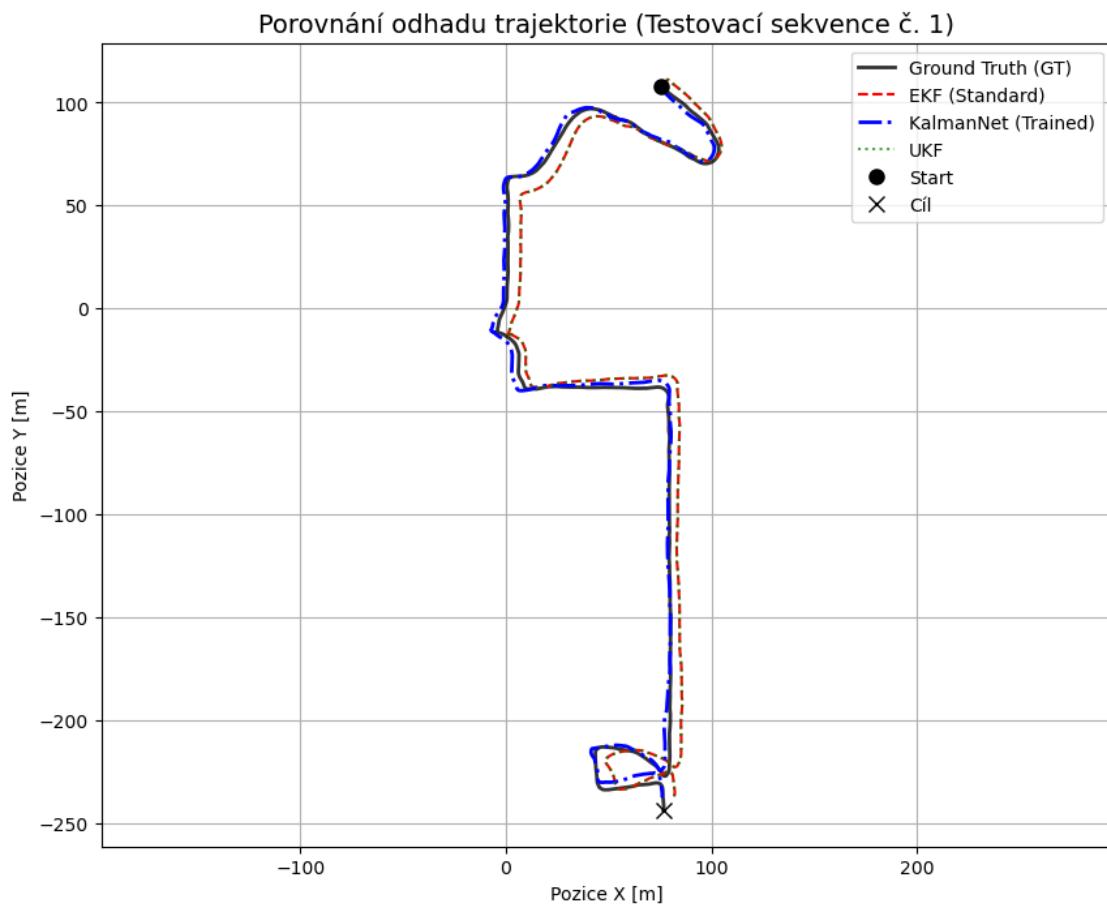
```

# --- Rychlosť X ---
axs[1, 0].plot(time_steps, gt_np[:, idx_vx], 'k-', label='GT', alpha=0.5)
axs[1, 0].plot(time_steps, ekf_np[:, idx_vx], 'r--', label='EKF')
axs[1, 0].plot(time_steps, knet_np[:, idx_vx], 'b-.', label='KalmanNet')
axs[1, 0].set_title("Rychlosť X (Velocity)")
axs[1, 0].set_ylabel("m/s")
axs[1, 0].grid(True)

# --- Rychlosť Y ---
axs[1, 1].plot(time_steps, gt_np[:, idx_vy], 'k-', label='GT', alpha=0.5)
axs[1, 1].plot(time_steps, ekf_np[:, idx_vy], 'r--', label='EKF')
axs[1, 1].plot(time_steps, knet_np[:, idx_vy], 'b-.', label='KalmanNet')
axs[1, 1].set_title("Rychlosť Y (Velocity)")
axs[1, 1].set_ylabel("m/s")
axs[1, 1].grid(True)

plt.tight_layout()
plt.show()

```



Detailní průběh stavů v čase

