2025-04-13 22:29:51 [INFO] Logging configured.

2025-04-13 22:29:51 [INFO] ============================================================

2025-04-13 22:29:51 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-13 22:29:51 [INFO] ============================================================

2025-04-13 22:29:51 [INFO] ==================================================

2025-04-13 22:29:51 [INFO] Simulation Configuration:

2025-04-13 22:29:51 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-13 22:29:51 [INFO] Re\_H: 10000

2025-04-13 22:29:51 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-13 22:29:51 [INFO] Network: 8 layers, 64 neurons

2025-04-13 22:29:51 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-13 22:29:51 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-13 22:29:51 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-13 22:29:51 [INFO] L-BFGS Iterations: 20000

2025-04-13 22:29:51 [INFO] Checkpoint Interval: 1000

2025-04-13 22:29:51 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-13 22:29:51 [INFO] Plotter Configuration:

2025-04-13 22:29:51 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-13 22:29:51 [INFO] ==================================================

2025-04-13 22:29:51 [INFO] Defined 10 boundary conditions.

2025-04-13 22:29:51 [INFO] Using 400 anchor points for wall functions.

2025-04-13 22:29:51 [INFO] Building the PINN model...

2025-04-13 22:29:52 [INFO] Model built successfully.

2025-04-13 22:29:52 [INFO] No suitable checkpoint found. Starting training from scratch.

2025-04-13 22:29:52 [INFO] Starting Adam training...

2025-04-14 11:45:49 [INFO] Logging configured.

2025-04-14 11:45:50 [INFO] ============================================================

2025-04-14 11:45:50 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 11:45:50 [INFO] ============================================================

2025-04-14 11:45:50 [INFO] ==================================================

2025-04-14 11:45:50 [INFO] Simulation Configuration:

2025-04-14 11:45:50 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 11:45:50 [INFO] Re\_H: 10000

2025-04-14 11:45:50 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 11:45:50 [INFO] Network: 8 layers, 64 neurons

2025-04-14 11:45:50 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 11:45:50 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 11:45:50 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 11:45:50 [INFO] L-BFGS Iterations: 20000

2025-04-14 11:45:50 [INFO] Checkpoint Interval: 1000

2025-04-14 11:45:50 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 11:45:50 [INFO] Plotter Configuration:

2025-04-14 11:45:50 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 11:45:50 [INFO] ==================================================

2025-04-14 11:45:50 [INFO] Defined 10 boundary conditions.

2025-04-14 11:45:50 [INFO] Using 400 anchor points for wall functions.

2025-04-14 11:45:50 [INFO] Building the PINN model...

2025-04-14 11:45:51 [INFO] Model built successfully.

2025-04-14 11:45:51 [INFO] Attempting to restore model from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf.ckpt-13000.pt

2025-04-14 11:45:51 [INFO] Starting Adam training...

2025-04-14 11:58:17 [INFO] Google Drive already mounted.

2025-04-14 11:58:17 [INFO] Setting up output directories...

2025-04-14 11:58:17 [INFO] Output directories verified/created.

2025-04-14 11:58:17 [INFO] Logging configured.

2025-04-14 11:58:17 [INFO] ============================================================

2025-04-14 11:58:17 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 11:58:17 [INFO] ============================================================

2025-04-14 11:58:17 [INFO] ==================================================

2025-04-14 11:58:17 [INFO] Simulation Configuration:

2025-04-14 11:58:17 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 11:58:17 [INFO] Re\_H: 10000

2025-04-14 11:58:17 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 11:58:17 [INFO] Network: 8 layers, 64 neurons

2025-04-14 11:58:17 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 11:58:17 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 11:58:17 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 11:58:17 [INFO] L-BFGS Iterations: 20000

2025-04-14 11:58:17 [INFO] Checkpoint Interval: 1000

2025-04-14 11:58:17 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 11:58:17 [INFO] Plotter Configuration:

2025-04-14 11:58:17 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 11:58:17 [INFO] ==================================================

2025-04-14 11:58:17 [INFO] Defined 10 boundary conditions.

2025-04-14 11:58:17 [INFO] Using 400 anchor points for wall functions.

2025-04-14 11:58:17 [INFO] Building the PINN model...

2025-04-14 11:58:17 [INFO] Model built successfully.

2025-04-14 11:58:17 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf.ckpt-13000.pt at step 13000

2025-04-14 11:58:17 [INFO] Restored step (13000) is less than target Adam iterations (50000).

2025-04-14 11:58:17 [INFO] Starting Adam training for remaining 37000 iterations...

2025-04-14 12:06:24 [INFO] Google Drive already mounted.

2025-04-14 12:06:24 [INFO] Setting up output directories...

2025-04-14 12:06:24 [INFO] Output directories verified/created.

2025-04-14 12:06:24 [INFO] Logging configured.

2025-04-14 12:06:24 [INFO] ============================================================

2025-04-14 12:06:24 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:06:24 [INFO] ============================================================

2025-04-14 12:06:24 [INFO] ==================================================

2025-04-14 12:06:24 [INFO] Simulation Configuration:

2025-04-14 12:06:24 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:06:24 [INFO] Re\_H: 10000

2025-04-14 12:06:24 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:06:24 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:06:24 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:06:24 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:06:24 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:06:24 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:06:24 [INFO] Checkpoint Interval: 1000

2025-04-14 12:06:24 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:06:24 [INFO] Plotter Configuration:

2025-04-14 12:06:24 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:06:24 [INFO] ==================================================

2025-04-14 12:06:24 [INFO] Defined 10 boundary conditions.

2025-04-14 12:06:24 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:06:24 [INFO] Building the PINN model...

2025-04-14 12:06:25 [INFO] Model built successfully.

2025-04-14 12:06:25 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf.ckpt-13000.pt at step 13000

2025-04-14 12:06:25 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:06:25 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf.ckpt-13000.pt

2025-04-14 12:06:25 [INFO] Model state restored. Internal step count after restore: 0

2025-04-14 12:06:25 [WARNING] Mismatch between expected restored step (13000) and model internal step (0) after restore!

2025-04-14 12:06:25 [INFO] Current step (13000) is less than target Adam iterations (50000).

2025-04-14 12:06:25 [INFO] Starting Adam training for remaining 37000 iterations...

2025-04-14 12:27:03 [INFO] Logging configured.

2025-04-14 12:27:03 [INFO] ============================================================

2025-04-14 12:27:03 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:27:03 [INFO] ============================================================

2025-04-14 12:27:03 [INFO] ==================================================

2025-04-14 12:27:03 [INFO] Simulation Configuration:

2025-04-14 12:27:03 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:27:03 [INFO] Re\_H: 10000

2025-04-14 12:27:03 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:27:03 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:27:03 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:27:03 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:27:03 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:27:03 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:27:03 [INFO] Checkpoint Interval: 1000

2025-04-14 12:27:03 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:27:03 [INFO] Plotter Configuration:

2025-04-14 12:27:03 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:27:03 [INFO] ==================================================

2025-04-14 12:27:03 [INFO] Defined 10 boundary conditions.

2025-04-14 12:27:03 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:27:03 [INFO] Building the PINN model...

2025-04-14 12:27:04 [INFO] Model built successfully.

2025-04-14 12:27:04 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf.ckpt-13000.pt at step 13000

2025-04-14 12:27:04 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:27:13 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf.ckpt-13000.pt

2025-04-14 12:27:13 [INFO] Model state restored. Internal step count \*after\* restore: 0

2025-04-14 12:27:13 [WARNING] Mismatch between expected restored step (13000) and model internal step (0) after restore!

2025-04-14 12:27:13 [INFO] Manually setting internal step count to the restored step: 13000

2025-04-14 12:27:13 [INFO] Internal step count after manual setting: 13000

2025-04-14 12:27:13 [INFO] Current step (13000) is less than target Adam iterations (50000).

2025-04-14 12:27:13 [INFO] Starting Adam training for remaining 37000 iterations...

2025-04-14 12:37:56 [INFO] Google Drive already mounted.

2025-04-14 12:37:56 [INFO] Setting up output directories...

2025-04-14 12:37:56 [INFO] Output directories verified/created.

2025-04-14 12:37:56 [INFO] Logging configured.

2025-04-14 12:37:56 [INFO] ============================================================

2025-04-14 12:37:56 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:37:56 [INFO] ============================================================

2025-04-14 12:37:56 [INFO] ==================================================

2025-04-14 12:37:56 [INFO] Simulation Configuration:

2025-04-14 12:37:56 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:37:56 [INFO] Re\_H: 10000

2025-04-14 12:37:56 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:37:56 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:37:56 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:37:56 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:37:56 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:37:56 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:37:56 [INFO] Checkpoint Interval: 1000

2025-04-14 12:37:56 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:37:56 [INFO] Plotter Configuration:

2025-04-14 12:37:56 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:37:56 [INFO] ==================================================

2025-04-14 12:37:56 [INFO] Defined 10 boundary conditions.

2025-04-14 12:37:56 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:37:56 [INFO] Building the PINN model...

2025-04-14 12:37:57 [INFO] Model built successfully.

2025-04-14 12:37:57 [INFO] Checkpoint filename format: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-{step}.pt

2025-04-14 12:37:57 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:37:57 [INFO] No suitable checkpoint found. Starting training from scratch.

2025-04-14 12:37:57 [INFO] Current step (0) is less than target Adam iterations (50000).

2025-04-14 12:37:57 [INFO] Starting Adam training for remaining 50000 iterations...

2025-04-14 12:40:16 [INFO] Google Drive already mounted.

2025-04-14 12:40:16 [INFO] Setting up output directories...

2025-04-14 12:40:16 [INFO] Output directories verified/created.

2025-04-14 12:40:16 [INFO] Logging configured.

2025-04-14 12:40:16 [INFO] ============================================================

2025-04-14 12:40:16 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:40:16 [INFO] ============================================================

2025-04-14 12:40:16 [INFO] ==================================================

2025-04-14 12:40:16 [INFO] Simulation Configuration:

2025-04-14 12:40:16 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:40:16 [INFO] Re\_H: 10000

2025-04-14 12:40:16 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:40:16 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:40:16 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:40:16 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:40:16 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:40:16 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:40:16 [INFO] Checkpoint Interval: 1000

2025-04-14 12:40:16 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:40:16 [INFO] Plotter Configuration:

2025-04-14 12:40:16 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:40:16 [INFO] ==================================================

2025-04-14 12:40:16 [INFO] Defined 10 boundary conditions.

2025-04-14 12:40:16 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:40:16 [INFO] Building the PINN model...

2025-04-14 12:40:16 [INFO] Model built successfully.

2025-04-14 12:40:16 [INFO] Checkpoint filename format: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-{step}.pt

2025-04-14 12:40:16 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt at step 13000

2025-04-14 12:40:16 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:40:16 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:40:16 [INFO] Model state restored. Internal step count \*after\* restore: 0

2025-04-14 12:40:16 [WARNING] Mismatch between expected restored step (13000) and model internal step (0) after restore!

2025-04-14 12:40:16 [INFO] Manually setting internal step count to the restored step: 13000

2025-04-14 12:40:16 [INFO] Internal step count after manual setting: 13000

2025-04-14 12:40:16 [INFO] Current step (13000) is less than target Adam iterations (50000).

2025-04-14 12:40:16 [INFO] Starting Adam training for remaining 37000 iterations...

2025-04-14 12:51:29 [INFO] Logging configured.

2025-04-14 12:51:29 [INFO] ============================================================

2025-04-14 12:51:29 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:51:29 [INFO] ============================================================

2025-04-14 12:51:29 [INFO] ==================================================

2025-04-14 12:51:29 [INFO] Simulation Configuration:

2025-04-14 12:51:29 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:51:29 [INFO] Re\_H: 10000

2025-04-14 12:51:29 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:51:29 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:51:29 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:51:29 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:51:29 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:51:29 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:51:29 [INFO] Checkpoint Interval: 1000

2025-04-14 12:51:29 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:51:29 [INFO] Plotter Configuration:

2025-04-14 12:51:29 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:51:29 [INFO] ==================================================

2025-04-14 12:51:29 [INFO] Defined 10 boundary conditions.

2025-04-14 12:51:29 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:51:29 [INFO] Building the PINN model...

2025-04-14 12:51:31 [INFO] Model built successfully.

2025-04-14 12:51:31 [INFO] Checkpoint filename base: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-

2025-04-14 12:51:31 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt at step 13000

2025-04-14 12:51:31 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:51:37 [INFO] Google Drive already mounted.

2025-04-14 12:51:37 [INFO] Setting up output directories...

2025-04-14 12:51:37 [INFO] Output directories verified/created.

2025-04-14 12:51:37 [INFO] Logging configured.

2025-04-14 12:51:37 [INFO] ============================================================

2025-04-14 12:51:37 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:51:37 [INFO] ============================================================

2025-04-14 12:51:37 [INFO] ==================================================

2025-04-14 12:51:37 [INFO] Simulation Configuration:

2025-04-14 12:51:37 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:51:37 [INFO] Re\_H: 10000

2025-04-14 12:51:37 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:51:37 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:51:37 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:51:37 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:51:37 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:51:37 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:51:37 [INFO] Checkpoint Interval: 1000

2025-04-14 12:51:37 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:51:37 [INFO] Plotter Configuration:

2025-04-14 12:51:37 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:51:37 [INFO] ==================================================

2025-04-14 12:51:37 [INFO] Defined 10 boundary conditions.

2025-04-14 12:51:37 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:51:37 [INFO] Building the PINN model...

2025-04-14 12:51:38 [INFO] Model built successfully.

2025-04-14 12:51:38 [INFO] Checkpoint filename base: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-

2025-04-14 12:51:38 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt at step 13000

2025-04-14 12:51:38 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:51:44 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:51:44 [INFO] Restoring parameters from /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:51:45 [ERROR] Failed during explicit model restore: Graph execution error:

Detected at node 'save\_1/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-2-53153f88e873>", line 761, in <cell line: 0>

File "<ipython-input-2-53153f88e873>", line 370, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_1/RestoreV2'

Detected at node 'save\_1/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-2-53153f88e873>", line 761, in <cell line: 0>

File "<ipython-input-2-53153f88e873>", line 370, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_1/RestoreV2'

2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_1/RestoreV2}}]]

[[save\_1/RestoreV2/\_51]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_1/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

Original stack trace for 'save\_1/RestoreV2':

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-2-53153f88e873>", line 761, in <cell line: 0>

File "<ipython-input-2-53153f88e873>", line 370, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 934, in \_\_init\_\_

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 946, in build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 974, in \_build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 543, in \_build\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 360, in \_AddRestoreOps

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 611, in bulk\_restore

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/ops/gen\_io\_ops.py", line 1522, in restore\_v2

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/op\_def\_library.py", line 796, in \_apply\_op\_helper

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 2701, in \_create\_op\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 1196, in from\_node\_def

Traceback (most recent call last):

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1407, in \_do\_call

return fn(\*args)

^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1390, in \_run\_fn

return self.\_call\_tf\_sessionrun(options, feed\_dict, fetch\_list,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1483, in \_call\_tf\_sessionrun

return tf\_session.TF\_SessionRun\_wrapper(self.\_session, options, feed\_dict,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

tensorflow.python.framework.errors\_impl.DataLossError: 2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_1/RestoreV2}}]]

[[save\_1/RestoreV2/\_51]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_1/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

During handling of the above exception, another exception occurred:

Traceback (most recent call last):

File "<ipython-input-2-53153f88e873>", line 375, in train

self.model.restore(restore\_path, verbose=1)

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 1123, in restore

self.saver.restore(self.sess, save\_path)

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 1422, in restore

sess.run(self.saver\_def.restore\_op\_name,

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 977, in run

result = self.\_run(None, fetches, feed\_dict, options\_ptr,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1220, in \_run

results = self.\_do\_run(handle, final\_targets, final\_fetches,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1400, in \_do\_run

return self.\_do\_call(\_run\_fn, feeds, fetches, targets, options,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1426, in \_do\_call

raise type(e)(node\_def, op, message) # pylint: disable=no-value-for-parameter

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

tensorflow.python.framework.errors\_impl.DataLossError: Graph execution error:

Detected at node 'save\_1/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-2-53153f88e873>", line 761, in <cell line: 0>

File "<ipython-input-2-53153f88e873>", line 370, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_1/RestoreV2'

Detected at node 'save\_1/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-2-53153f88e873>", line 761, in <cell line: 0>

File "<ipython-input-2-53153f88e873>", line 370, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_1/RestoreV2'

2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_1/RestoreV2}}]]

[[save\_1/RestoreV2/\_51]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_1/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

Original stack trace for 'save\_1/RestoreV2':

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

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File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

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File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 974, in \_build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 543, in \_build\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 360, in \_AddRestoreOps

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 611, in bulk\_restore

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/ops/gen\_io\_ops.py", line 1522, in restore\_v2

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/op\_def\_library.py", line 796, in \_apply\_op\_helper

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 2701, in \_create\_op\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 1196, in from\_node\_def

2025-04-14 12:51:45 [ERROR] Training phase finished but returned invalid state.

2025-04-14 12:51:45 [ERROR] Training did not complete successfully. Skipping post-processing.

2025-04-14 12:51:45 [INFO] ============================================================

2025-04-14 12:51:45 [INFO] Script Execution Finished in 7.33 seconds

2025-04-14 12:51:45 [INFO] ============================================================

2025-04-14 12:54:37 [INFO] Google Drive already mounted.

2025-04-14 12:54:37 [INFO] Setting up output directories...

2025-04-14 12:54:37 [INFO] Output directories verified/created.

2025-04-14 12:54:37 [INFO] Logging configured.

2025-04-14 12:54:37 [INFO] ============================================================

2025-04-14 12:54:37 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:54:37 [INFO] ============================================================

2025-04-14 12:54:37 [INFO] ==================================================

2025-04-14 12:54:37 [INFO] Simulation Configuration:

2025-04-14 12:54:37 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:54:37 [INFO] Re\_H: 10000

2025-04-14 12:54:37 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:54:37 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:54:37 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:54:37 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:54:37 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:54:37 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:54:37 [INFO] Checkpoint Interval: 1000

2025-04-14 12:54:37 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:54:37 [INFO] Plotter Configuration:

2025-04-14 12:54:37 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:54:37 [INFO] ==================================================

2025-04-14 12:54:37 [INFO] Defined 10 boundary conditions.

2025-04-14 12:54:37 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:54:37 [INFO] Building the PINN model...

2025-04-14 12:54:38 [INFO] Model built successfully.

2025-04-14 12:54:38 [INFO] Checkpoint filename base: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-

2025-04-14 12:54:38 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt at step 13000

2025-04-14 12:54:38 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:54:43 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:54:43 [INFO] Restoring parameters from /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:54:44 [ERROR] Failed during explicit model restore: Graph execution error:

Detected at node 'save\_2/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-3-ff8be214e97c>", line 797, in <cell line: 0>

File "<ipython-input-3-ff8be214e97c>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_2/RestoreV2'

Detected at node 'save\_2/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-3-ff8be214e97c>", line 797, in <cell line: 0>

File "<ipython-input-3-ff8be214e97c>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_2/RestoreV2'

2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_2/RestoreV2}}]]

[[save\_2/RestoreV2/\_69]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_2/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

Original stack trace for 'save\_2/RestoreV2':

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-3-ff8be214e97c>", line 797, in <cell line: 0>

File "<ipython-input-3-ff8be214e97c>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 934, in \_\_init\_\_

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 946, in build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 974, in \_build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 543, in \_build\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 360, in \_AddRestoreOps

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 611, in bulk\_restore

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/ops/gen\_io\_ops.py", line 1522, in restore\_v2

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/op\_def\_library.py", line 796, in \_apply\_op\_helper

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 2701, in \_create\_op\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 1196, in from\_node\_def

Traceback (most recent call last):

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1407, in \_do\_call

return fn(\*args)

^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1390, in \_run\_fn

return self.\_call\_tf\_sessionrun(options, feed\_dict, fetch\_list,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1483, in \_call\_tf\_sessionrun

return tf\_session.TF\_SessionRun\_wrapper(self.\_session, options, feed\_dict,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

tensorflow.python.framework.errors\_impl.DataLossError: 2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_2/RestoreV2}}]]

[[save\_2/RestoreV2/\_69]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_2/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

During handling of the above exception, another exception occurred:

Traceback (most recent call last):

File "<ipython-input-3-ff8be214e97c>", line 411, in train

self.model.restore(restore\_path, verbose=1)

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 1123, in restore

self.saver.restore(self.sess, save\_path)

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 1422, in restore

sess.run(self.saver\_def.restore\_op\_name,

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 977, in run

result = self.\_run(None, fetches, feed\_dict, options\_ptr,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1220, in \_run

results = self.\_do\_run(handle, final\_targets, final\_fetches,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1400, in \_do\_run

return self.\_do\_call(\_run\_fn, feeds, fetches, targets, options,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1426, in \_do\_call

raise type(e)(node\_def, op, message) # pylint: disable=no-value-for-parameter

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

tensorflow.python.framework.errors\_impl.DataLossError: Graph execution error:

Detected at node 'save\_2/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-3-ff8be214e97c>", line 797, in <cell line: 0>

File "<ipython-input-3-ff8be214e97c>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_2/RestoreV2'

Detected at node 'save\_2/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-3-ff8be214e97c>", line 797, in <cell line: 0>

File "<ipython-input-3-ff8be214e97c>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_2/RestoreV2'

2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_2/RestoreV2}}]]

[[save\_2/RestoreV2/\_69]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_2/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

Original stack trace for 'save\_2/RestoreV2':

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-3-ff8be214e97c>", line 797, in <cell line: 0>

File "<ipython-input-3-ff8be214e97c>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 934, in \_\_init\_\_

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 946, in build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 974, in \_build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 543, in \_build\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 360, in \_AddRestoreOps

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 611, in bulk\_restore

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/ops/gen\_io\_ops.py", line 1522, in restore\_v2

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/op\_def\_library.py", line 796, in \_apply\_op\_helper

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 2701, in \_create\_op\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 1196, in from\_node\_def

2025-04-14 12:54:44 [ERROR] Training phase finished but returned invalid state.

2025-04-14 12:54:44 [ERROR] Training did not complete successfully. Skipping post-processing.

2025-04-14 12:54:44 [INFO] ============================================================

2025-04-14 12:54:44 [INFO] Script Execution Finished in 6.67 seconds

2025-04-14 12:54:44 [INFO] ============================================================

2025-04-14 12:55:12 [INFO] Google Drive already mounted.

2025-04-14 12:55:12 [INFO] Setting up output directories...

2025-04-14 12:55:12 [INFO] Output directories verified/created.

2025-04-14 12:55:12 [INFO] Logging configured.

2025-04-14 12:55:12 [INFO] ============================================================

2025-04-14 12:55:12 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:55:12 [INFO] ============================================================

2025-04-14 12:55:12 [INFO] ==================================================

2025-04-14 12:55:12 [INFO] Simulation Configuration:

2025-04-14 12:55:12 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:55:12 [INFO] Re\_H: 10000

2025-04-14 12:55:12 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:55:12 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:55:12 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:55:12 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:55:12 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:55:12 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:55:12 [INFO] Checkpoint Interval: 1000

2025-04-14 12:55:12 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:55:12 [INFO] Plotter Configuration:

2025-04-14 12:55:12 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:55:12 [INFO] ==================================================

2025-04-14 12:55:12 [INFO] Defined 10 boundary conditions.

2025-04-14 12:55:12 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:55:12 [INFO] Building the PINN model...

2025-04-14 12:55:13 [INFO] Model built successfully.

2025-04-14 12:55:13 [INFO] Checkpoint filename base: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-

2025-04-14 12:55:13 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt at step 13000

2025-04-14 12:55:13 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:55:18 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:55:18 [INFO] Restoring parameters from /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:55:19 [ERROR] Failed during explicit model restore: Graph execution error:

Detected at node 'save\_3/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-4-742d4e3ff3b8>", line 797, in <cell line: 0>

File "<ipython-input-4-742d4e3ff3b8>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_3/RestoreV2'

Detected at node 'save\_3/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-4-742d4e3ff3b8>", line 797, in <cell line: 0>

File "<ipython-input-4-742d4e3ff3b8>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_3/RestoreV2'

2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_3/RestoreV2}}]]

[[save\_3/RestoreV2/\_153]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_3/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

Original stack trace for 'save\_3/RestoreV2':

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

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File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 934, in \_\_init\_\_

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 946, in build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 974, in \_build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 543, in \_build\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 360, in \_AddRestoreOps

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 611, in bulk\_restore

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/ops/gen\_io\_ops.py", line 1522, in restore\_v2

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/op\_def\_library.py", line 796, in \_apply\_op\_helper

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 2701, in \_create\_op\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 1196, in from\_node\_def

Traceback (most recent call last):

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1407, in \_do\_call

return fn(\*args)

^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1390, in \_run\_fn

return self.\_call\_tf\_sessionrun(options, feed\_dict, fetch\_list,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1483, in \_call\_tf\_sessionrun

return tf\_session.TF\_SessionRun\_wrapper(self.\_session, options, feed\_dict,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

tensorflow.python.framework.errors\_impl.DataLossError: 2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_3/RestoreV2}}]]

[[save\_3/RestoreV2/\_153]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_3/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

During handling of the above exception, another exception occurred:

Traceback (most recent call last):

File "<ipython-input-4-742d4e3ff3b8>", line 411, in train

self.model.restore(restore\_path, verbose=1)

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 1123, in restore

self.saver.restore(self.sess, save\_path)

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 1422, in restore

sess.run(self.saver\_def.restore\_op\_name,

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 977, in run

result = self.\_run(None, fetches, feed\_dict, options\_ptr,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1220, in \_run

results = self.\_do\_run(handle, final\_targets, final\_fetches,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1400, in \_do\_run

return self.\_do\_call(\_run\_fn, feeds, fetches, targets, options,

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/client/session.py", line 1426, in \_do\_call

raise type(e)(node\_def, op, message) # pylint: disable=no-value-for-parameter

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

tensorflow.python.framework.errors\_impl.DataLossError: Graph execution error:

Detected at node 'save\_3/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-4-742d4e3ff3b8>", line 797, in <cell line: 0>

File "<ipython-input-4-742d4e3ff3b8>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_3/RestoreV2'

Detected at node 'save\_3/RestoreV2' defined at (most recent call last):

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

File "/usr/local/lib/python3.11/dist-packages/tornado/platform/asyncio.py", line 205, in start

File "/usr/lib/python3.11/asyncio/base\_events.py", line 608, in run\_forever

File "/usr/lib/python3.11/asyncio/base\_events.py", line 1936, in \_run\_once

File "/usr/lib/python3.11/asyncio/events.py", line 84, in \_run

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 406, in dispatch\_shell

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 730, in execute\_request

File "/usr/local/lib/python3.11/dist-packages/ipykernel/ipkernel.py", line 383, in do\_execute

File "/usr/local/lib/python3.11/dist-packages/ipykernel/zmqshell.py", line 528, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 2975, in run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3030, in \_run\_cell

File "/usr/local/lib/python3.11/dist-packages/IPython/core/async\_helpers.py", line 78, in \_pseudo\_sync\_runner

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3257, in run\_cell\_async

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3473, in run\_ast\_nodes

File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-4-742d4e3ff3b8>", line 797, in <cell line: 0>

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File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

Node: 'save\_3/RestoreV2'

2 root error(s) found.

(0) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_3/RestoreV2}}]]

[[save\_3/RestoreV2/\_153]]

(1) DATA\_LOSS: Unable to open table file /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt: DATA\_LOSS: not an sstable (bad magic number): perhaps your file is in a different file format and you need to use a different restore operator?

[[{{node save\_3/RestoreV2}}]]

0 successful operations.

0 derived errors ignored.

Original stack trace for 'save\_3/RestoreV2':

File "<frozen runpy>", line 198, in \_run\_module\_as\_main

File "<frozen runpy>", line 88, in \_run\_code

File "/usr/local/lib/python3.11/dist-packages/colab\_kernel\_launcher.py", line 37, in <module>

File "/usr/local/lib/python3.11/dist-packages/traitlets/config/application.py", line 992, in launch\_instance

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelapp.py", line 712, in start

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File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 510, in dispatch\_queue

File "/usr/local/lib/python3.11/dist-packages/ipykernel/kernelbase.py", line 499, in process\_one

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File "/usr/local/lib/python3.11/dist-packages/IPython/core/interactiveshell.py", line 3553, in run\_code

File "<ipython-input-4-742d4e3ff3b8>", line 797, in <cell line: 0>

File "<ipython-input-4-742d4e3ff3b8>", line 406, in train

File "/usr/local/lib/python3.11/dist-packages/deepxde/utils/internal.py", line 22, in wrapper

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 140, in compile

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 171, in \_compile\_tensorflow\_compat\_v1

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 934, in \_\_init\_\_

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 946, in build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 974, in \_build

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 543, in \_build\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 360, in \_AddRestoreOps

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/training/saver.py", line 611, in bulk\_restore

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/ops/gen\_io\_ops.py", line 1522, in restore\_v2

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/op\_def\_library.py", line 796, in \_apply\_op\_helper

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 2701, in \_create\_op\_internal

File "/usr/local/lib/python3.11/dist-packages/tensorflow/python/framework/ops.py", line 1196, in from\_node\_def

2025-04-14 12:55:19 [ERROR] Training phase finished but returned invalid state.

2025-04-14 12:55:19 [ERROR] Training did not complete successfully. Skipping post-processing.

2025-04-14 12:55:19 [INFO] ============================================================

2025-04-14 12:55:19 [INFO] Script Execution Finished in 6.58 seconds

2025-04-14 12:55:19 [INFO] ============================================================

2025-04-14 12:55:42 [INFO] Logging configured.

2025-04-14 12:55:42 [INFO] ============================================================

2025-04-14 12:55:42 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 12:55:42 [INFO] ============================================================

2025-04-14 12:55:42 [INFO] ==================================================

2025-04-14 12:55:42 [INFO] Simulation Configuration:

2025-04-14 12:55:42 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 12:55:42 [INFO] Re\_H: 10000

2025-04-14 12:55:42 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 12:55:42 [INFO] Network: 8 layers, 64 neurons

2025-04-14 12:55:42 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 12:55:42 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 12:55:42 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 12:55:42 [INFO] L-BFGS Iterations: 20000

2025-04-14 12:55:42 [INFO] Checkpoint Interval: 1000

2025-04-14 12:55:42 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 12:55:42 [INFO] Plotter Configuration:

2025-04-14 12:55:42 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 12:55:42 [INFO] ==================================================

2025-04-14 12:55:42 [INFO] Defined 10 boundary conditions.

2025-04-14 12:55:42 [INFO] Using 400 anchor points for wall functions.

2025-04-14 12:55:42 [INFO] Building the PINN model...

2025-04-14 12:55:43 [INFO] Model built successfully.

2025-04-14 12:55:43 [INFO] Checkpoint filename base: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-

2025-04-14 12:55:43 [INFO] Found latest checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt at step 13000

2025-04-14 12:55:43 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 12:55:47 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 12:55:48 [INFO] Model state restored. Internal step count \*after\* restore: 0

2025-04-14 12:55:48 [WARNING] Mismatch between expected restored step (13000) and model internal step (0) after restore!

2025-04-14 12:55:48 [INFO] Manually setting internal step count to the restored step: 13000

2025-04-14 12:55:48 [INFO] Internal step count after manual setting: 13000

2025-04-14 12:55:48 [INFO] Current step (13000) is less than target Adam iterations (50000).

2025-04-14 12:55:48 [INFO] Starting Adam training for remaining 37000 iterations...

2025-04-14 12:59:52 [INFO] Step 14000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-14000.pt ...

2025-04-14 13:03:55 [INFO] Step 15000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-15000.pt ...

2025-04-14 13:07:58 [INFO] Step 16000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-16000.pt ...

2025-04-14 13:12:01 [INFO] Step 17000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-17000.pt ...

2025-04-14 13:22:38 [INFO] Logging configured.

2025-04-14 13:22:38 [INFO] ============================================================

2025-04-14 13:22:38 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 13:22:38 [INFO] ============================================================

2025-04-14 13:22:38 [INFO] ==================================================

2025-04-14 13:22:38 [INFO] Simulation Configuration:

2025-04-14 13:22:38 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 13:22:38 [INFO] Re\_H: 10000

2025-04-14 13:22:38 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 13:22:38 [INFO] Network: 8 layers, 64 neurons

2025-04-14 13:22:38 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 13:22:38 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 13:22:38 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 13:22:38 [INFO] L-BFGS Iterations: 20000

2025-04-14 13:22:38 [INFO] Checkpoint Interval: 1000

2025-04-14 13:22:38 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 13:22:38 [INFO] Plotter Configuration:

2025-04-14 13:22:38 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 13:22:38 [INFO] ==================================================

2025-04-14 13:22:38 [INFO] Defined 10 boundary conditions.

2025-04-14 13:22:38 [INFO] Using 400 anchor points for wall functions.

2025-04-14 13:22:38 [INFO] Building the PINN model...

2025-04-14 13:22:39 [INFO] Model built successfully.

2025-04-14 13:22:39 [INFO] Checkpoint filename base: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-

2025-04-14 13:22:39 [INFO] Searching for checkpoints in: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints

2025-04-14 13:22:39 [INFO] Using pattern: ^rans\_channel\_wf-(\d+)\.pt$

2025-04-14 13:22:39 [INFO] Found latest valid checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt at step 13000

2025-04-14 13:22:39 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 13:22:41 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-13000.pt

2025-04-14 13:22:41 [INFO] Model state restored. Internal DDE step count \*after\* restore: 0

2025-04-14 13:22:41 [WARNING] Mismatch between expected restored step (13000) and DDE internal step (0) after restore! Forcing DDE step.

2025-04-14 13:22:41 [INFO] Manually setting internal step count to the restored step: 13000

2025-04-14 13:22:41 [INFO] Internal step count after manual setting: 13000

2025-04-14 13:22:41 [INFO] Current step (13000) is less than target Adam iterations (50000).

2025-04-14 13:22:41 [INFO] Starting Adam training for remaining 37000 iterations...

2025-04-14 13:26:45 [INFO] Step 14000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-14000.pt ...

2025-04-14 13:30:48 [INFO] Step 15000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-15000.pt ...

2025-04-14 13:34:51 [INFO] Step 16000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-16000.pt ...

2025-04-14 13:38:54 [INFO] Step 17000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-17000.pt ...

2025-04-14 13:42:57 [INFO] Step 18000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-18000.pt ...

2025-04-14 13:46:59 [INFO] Step 19000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-19000.pt ...

2025-04-14 13:51:01 [INFO] Step 20000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-20000.pt ...

2025-04-14 13:55:04 [INFO] Step 21000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-21000.pt ...

2025-04-14 13:59:07 [INFO] Step 22000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-22000.pt ...

2025-04-14 14:03:10 [INFO] Step 23000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-23000.pt ...

2025-04-14 14:07:12 [INFO] Step 24000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-24000.pt ...

2025-04-14 14:11:15 [INFO] Step 25000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-25000.pt ...

2025-04-14 14:15:17 [INFO] Step 26000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-26000.pt ...

2025-04-14 14:19:20 [INFO] Step 27000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-27000.pt ...

2025-04-14 14:23:23 [INFO] Step 28000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-28000.pt ...

2025-04-14 14:27:26 [INFO] Step 29000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-29000.pt ...

2025-04-14 14:31:29 [INFO] Step 30000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-30000.pt ...

2025-04-14 14:35:32 [INFO] Step 31000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-31000.pt ...

2025-04-14 14:39:35 [INFO] Step 32000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-32000.pt ...

2025-04-14 14:43:38 [INFO] Step 33000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-33000.pt ...

2025-04-14 14:47:41 [INFO] Step 34000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-34000.pt ...

2025-04-14 14:51:44 [INFO] Step 35000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-35000.pt ...

2025-04-14 14:55:47 [INFO] Step 36000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-36000.pt ...

2025-04-14 14:59:50 [INFO] Step 37000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-37000.pt ...

2025-04-14 15:03:53 [INFO] Step 38000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-38000.pt ...

2025-04-14 15:07:56 [INFO] Step 39000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-39000.pt ...

2025-04-14 15:11:59 [INFO] Step 40000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-40000.pt ...

2025-04-14 15:16:02 [INFO] Step 41000: saving model to /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-41000.pt ...

2025-04-14 16:51:51 [INFO] Logging configured.

2025-04-14 16:51:51 [INFO] ============================================================

2025-04-14 16:51:51 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 16:51:51 [INFO] ============================================================

2025-04-14 16:51:51 [INFO] ==================================================

2025-04-14 16:51:51 [INFO] Simulation Configuration:

2025-04-14 16:51:51 [INFO] Output Directory: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow

2025-04-14 16:51:51 [INFO] Re\_H: 10000

2025-04-14 16:51:51 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 16:51:51 [INFO] Network: 8 layers, 64 neurons

2025-04-14 16:51:51 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 16:51:51 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 16:51:51 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 16:51:51 [INFO] L-BFGS Iterations: 20000

2025-04-14 16:51:51 [INFO] Checkpoint Interval: 1000

2025-04-14 16:51:51 [INFO] Reference Data File (CSV): /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/data/reference\_output\_data.csv

2025-04-14 16:51:51 [INFO] Plotter Configuration:

2025-04-14 16:51:51 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 16:51:51 [INFO] ==================================================

2025-04-14 16:51:52 [INFO] Defined 10 boundary conditions.

2025-04-14 16:51:52 [INFO] Using 400 anchor points for wall functions.

2025-04-14 16:51:52 [INFO] Building the PINN model...

2025-04-14 16:51:52 [INFO] Model built successfully.

2025-04-14 16:51:52 [INFO] Checkpoint filename base: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-

2025-04-14 16:51:52 [INFO] Searching for checkpoints in: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints

2025-04-14 16:51:52 [INFO] Using pattern: ^rans\_channel\_wf-(\d+)\.pt$

2025-04-14 16:51:52 [INFO] Found latest valid checkpoint: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-54000.pt at step 54000

2025-04-14 16:51:52 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 16:51:59 [INFO] Explicitly restoring model state from: /content/drive/MyDrive/PINN\_RANS\_ChannelFlow/model\_checkpoints/rans\_channel\_wf-54000.pt

2025-04-14 16:52:01 [ERROR] Failed during explicit model restore: Attempting to deserialize object on a CUDA device but torch.cuda.is\_available() is False. If you are running on a CPU-only machine, please use torch.load with map\_location=torch.device('cpu') to map your storages to the CPU.

Traceback (most recent call last):

File "<ipython-input-6-200b3a7ec1fd>", line 510, in train

self.model.restore(restore\_path, verbose=1)

File "/usr/local/lib/python3.11/dist-packages/deepxde/model.py", line 1130, in restore

checkpoint = torch.load(save\_path)

^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/serialization.py", line 1462, in load

return \_load(

^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/serialization.py", line 1964, in \_load

result = unpickler.load()

^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/\_weights\_only\_unpickler.py", line 512, in load

self.append(self.persistent\_load(pid))

^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/serialization.py", line 1928, in persistent\_load

typed\_storage = load\_tensor(

^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/serialization.py", line 1900, in load\_tensor

wrap\_storage=restore\_location(storage, location),

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/serialization.py", line 693, in default\_restore\_location

result = fn(storage, location)

^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/serialization.py", line 631, in \_deserialize

device = \_validate\_device(location, backend\_name)

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "/usr/local/lib/python3.11/dist-packages/torch/serialization.py", line 600, in \_validate\_device

raise RuntimeError(

RuntimeError: Attempting to deserialize object on a CUDA device but torch.cuda.is\_available() is False. If you are running on a CPU-only machine, please use torch.load with map\_location=torch.device('cpu') to map your storages to the CPU.

2025-04-14 16:52:01 [ERROR] Training phase finished but returned invalid state (model, losshistory, or train\_state is None).

2025-04-14 16:52:01 [ERROR] Training did not complete successfully or produced an invalid state. Skipping post-processing.

2025-04-14 16:52:01 [INFO] ============================================================

2025-04-14 16:52:01 [INFO] Script Execution Finished in 9.90 seconds

2025-04-14 16:52:01 [INFO] ============================================================

2025-04-14 23:17:14 [INFO] Setting up output directories...

2025-04-14 23:17:14 [INFO] Output directories verified/created.

2025-04-14 23:17:14 [INFO] Logging configured.

2025-04-14 23:17:14 [INFO] ============================================================

2025-04-14 23:17:14 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 23:17:14 [INFO] ============================================================

2025-04-14 23:17:14 [INFO] ==================================================

2025-04-14 23:17:14 [INFO] Simulation Configuration:

2025-04-14 23:17:14 [INFO] Output Directory: PINN\_RANS\_ChannelFlow

2025-04-14 23:17:14 [INFO] Re\_H: 10000

2025-04-14 23:17:14 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 23:17:14 [INFO] Network: 8 layers, 64 neurons

2025-04-14 23:17:14 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 23:17:14 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 23:17:14 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 23:17:14 [INFO] L-BFGS Iterations: 20000

2025-04-14 23:17:14 [INFO] Checkpoint Interval: 1000

2025-04-14 23:17:14 [INFO] Reference Data File (CSV): PINN\_RANS\_ChannelFlow\data\reference\_output\_data.csv

2025-04-14 23:17:14 [INFO] Plotter Configuration:

2025-04-14 23:17:14 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 23:17:14 [INFO] ==================================================

2025-04-14 23:17:16 [INFO] Defined 10 boundary conditions.

2025-04-14 23:17:16 [INFO] Using 400 anchor points for wall functions.

2025-04-14 23:17:16 [INFO] Building the PINN model...

2025-04-14 23:17:16 [INFO] Model built successfully.

2025-04-14 23:17:16 [INFO] Checkpoint filename base: PINN\_RANS\_ChannelFlow\model\_checkpoints\rans\_channel\_wf-

2025-04-14 23:17:16 [INFO] Searching for checkpoints in: PINN\_RANS\_ChannelFlow\model\_checkpoints

2025-04-14 23:17:16 [INFO] Using pattern: ^rans\_channel\_wf-(\d+)\.pt$

2025-04-14 23:17:16 [INFO] Found latest valid checkpoint: PINN\_RANS\_ChannelFlow\model\_checkpoints\rans\_channel\_wf-54000.pt at step 54000

2025-04-14 23:17:16 [INFO] Compiling model with Adam optimizer initially.

2025-04-14 23:17:20 [INFO] Explicitly restoring model state from: PINN\_RANS\_ChannelFlow\model\_checkpoints\rans\_channel\_wf-54000.pt

2025-04-14 23:17:20 [ERROR] Failed during explicit model restore: 'step'

Traceback (most recent call last):

File "C:\Users\rajab\AppData\Local\Temp\ipykernel\_26736\645873979.py", line 346, in train

self.model.restore(restore\_path, verbose=1)

File "c:\Users\rajab\Documents\workspace\PINN\_TurbulentChannelFlow\.conda\Lib\site-packages\deepxde\model.py", line 1132, in restore

self.opt.load\_state\_dict(checkpoint["optimizer\_state\_dict"])

File "c:\Users\rajab\Documents\workspace\PINN\_TurbulentChannelFlow\.conda\Lib\site-packages\torch\\_compile.py", line 32, in inner

return disable\_fn(\*args, \*\*kwargs)

^^^^^^^^^^^^^^^^^^^^^^^^^^^

File "c:\Users\rajab\Documents\workspace\PINN\_TurbulentChannelFlow\.conda\Lib\site-packages\torch\\_dynamo\eval\_frame.py", line 745, in \_fn

return fn(\*args, \*\*kwargs)

^^^^^^^^^^^^^^^^^^^

File "c:\Users\rajab\Documents\workspace\PINN\_TurbulentChannelFlow\.conda\Lib\site-packages\torch\optim\optimizer.py", line 934, in load\_state\_dict

self.\_\_setstate\_\_({"state": state, "param\_groups": param\_groups})

File "c:\Users\rajab\Documents\workspace\PINN\_TurbulentChannelFlow\.conda\Lib\site-packages\torch\optim\adam.py", line 123, in \_\_setstate\_\_

if len(p\_state) != 0 and not torch.is\_tensor(p\_state["step"]):

~~~~~~~^^^^^^^^

KeyError: 'step'

2025-04-14 23:17:20 [ERROR] Training phase finished but returned invalid state (model, losshistory, or train\_state is None).

2025-04-14 23:17:20 [ERROR] Training did not complete successfully or produced an invalid state. Skipping post-processing.

2025-04-14 23:17:20 [INFO] ============================================================

2025-04-14 23:17:20 [INFO] Script Execution Finished in 5.33 seconds

2025-04-14 23:17:20 [INFO] ============================================================

2025-04-14 23:38:14 [INFO] Logging configured.

2025-04-14 23:38:14 [INFO] ============================================================

2025-04-14 23:38:14 [INFO] PINN RANS k-epsilon Channel Flow Simulation Start

2025-04-14 23:38:14 [INFO] ============================================================

2025-04-14 23:38:14 [INFO] ==================================================

2025-04-14 23:38:14 [INFO] Simulation Configuration:

2025-04-14 23:38:14 [INFO] Output Directory: PINN\_RANS\_ChannelFlow

2025-04-14 23:38:14 [INFO] Re\_H: 10000

2025-04-14 23:38:14 [INFO] Wall Function y\_p: 0.04 (Target y+: 14.00)

2025-04-14 23:38:14 [INFO] Network: 8 layers, 64 neurons

2025-04-14 23:38:14 [INFO] Inlet k (log): -5.5860, Inlet eps (log): -7.5257

2025-04-14 23:38:14 [INFO] Target WF U: 0.8402, k (log): -4.1145, eps (log): -3.8673

2025-04-14 23:38:14 [INFO] Adam Iterations: 50000, LR: 0.001

2025-04-14 23:38:14 [INFO] L-BFGS Iterations: 20000

2025-04-14 23:38:14 [INFO] Checkpoint Interval: 1000

2025-04-14 23:38:14 [INFO] Reference Data File (CSV): PINN\_RANS\_ChannelFlow\data\reference\_output\_data.csv

2025-04-14 23:38:14 [INFO] Plotter Configuration:

2025-04-14 23:38:14 [INFO] Prediction Grid Nx: 200, Ny: 100

2025-04-14 23:38:14 [INFO] ==================================================

2025-04-14 23:38:14 [INFO] Generated 400 anchor points for wall functions.

2025-04-14 23:38:15 [INFO] Defined 10 boundary conditions.

2025-04-14 23:38:15 [INFO] Using 400 anchor points for wall functions.

2025-04-14 23:38:15 [INFO] Building the PINN model...

2025-04-14 23:38:15 [INFO] Model built successfully.

2025-04-14 23:38:15 [INFO] Checkpoint filename base: PINN\_RANS\_ChannelFlow\model\_checkpoints\rans\_channel\_wf-

2025-04-14 23:38:15 [INFO] Searching for checkpoints in: PINN\_RANS\_ChannelFlow\model\_checkpoints

2025-04-14 23:38:15 [INFO] Using pattern: ^rans\_channel\_wf-(\d+)\.pt$

2025-04-14 23:38:15 [INFO] Found latest valid checkpoint: PINN\_RANS\_ChannelFlow\model\_checkpoints\rans\_channel\_wf-54000.pt at step 54000

2025-04-14 23:38:15 [INFO] Restored step (54000) >= Adam iterations (50000). Will compile with L-BFGS initially.

2025-04-14 23:38:15 [INFO] Compiling model with L-BFGS optimizer initially.

2025-04-14 23:38:19 [INFO] Model compiled with L-BFGS.

2025-04-14 23:38:19 [INFO] Explicitly restoring model state from: PINN\_RANS\_ChannelFlow\model\_checkpoints\rans\_channel\_wf-54000.pt

2025-04-14 23:38:19 [INFO] Model state restored. Internal DDE step count \*after\* restore: 0

2025-04-14 23:38:19 [WARNING] Mismatch between expected restored step (54000) and DDE internal step (0) after restore! Forcing DDE step.

2025-04-14 23:38:19 [INFO] Manually setting internal step count to the restored step: 54000

2025-04-14 23:38:19 [INFO] Internal step count after manual setting: 54000

2025-04-14 23:38:19 [INFO] Skipping Adam phase as initial compilation was L-BFGS.

2025-04-14 23:38:19 [INFO] Proceeding to L-BFGS phase (current step 54000). Target iterations for this phase: 20000

2025-04-14 23:38:19 [INFO] Optimizer is already L-BFGS (likely resumed). No recompilation needed.