

Objective: to add time/memory tracking features to nemo5

- Define tic-tocs points
- Define hierarchical structure of tic-tocs
- generate reports
- Track Petsc allocated memory
- integrate memory reporting to tic-tocs calls

Approach:

[1] to add tic-toc functions calls on critical sections of the code.

[2] to save information in a tree-based hierarchy.

[3] to report information on different text based formats.

[4] to report based on a single execution or collective operations

```
+<TIME name="Greensolver("d1:Propagation5sstar"):do_init " time="1.28746e-05" count="1" max="1.28746e-05"
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-<TIME name="Propagation("d1:Propagation2_dstar"):base_init " time="0.000104904" count="1" max="0.000104904"
-<TIME name="Propagation("d1:Propagation2_dstar"):base_read_function_list " time="6.69956e-05" count="1" max="6.69956e-05"
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-<TIME name="Propagation("d1:Propagation2_dstar"):set_job_done_momentum_map " time="0.000688076" count="1" max="0.000688076"
-<TIME name="Propagation("d1:Propagation2_dstar"):initialize_Propagation " time="0.000673056" count="1" max="0.000673056"
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-<TIME name="Propagation("d1:Propagation2_dstar"):initialize_Propagators2 " time="0.000546932" count="1" max="0.000546932"
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-<TIME name="Propagation("d1:Propagation2_dstar"):set_parallel_environment " time="1.69277e-05" count="1" max="1.69277e-05"
<TIME name="Propagation("d1:Propagation_Parallelizer"):get_data1 " time="4.05312e-06" count="1" max="4.05312e-06"
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```

Results:

- A new Tic-Toc Implementation was added to Nemo5 (NemoTiming).
- Nemo5 validates tic-tocs consistency (overlaped tic-tocs).
- NemoTiming exports times in different formats XML, JSON, TXT, XLS (CSV).
- Timing report supports time/memory aggregation.