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Towards a fast and reliable global fit with Sequential Neural Likelihood

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The LISA mission will detect many overlapping gravitational wave signals, making data analysis particularly challenging. Due to the high dimensionality of the problem, the global fit of all sources using traditional Bayesian methods is expected to be by far the most computationally intensive task that the LISA Distributed Data Processing Centre (DDPC) will perform. As such, there is interest in accelerating the global fit using alternative algorithms.

We investigate Sequential Neural Likelihood (SNL) as a simulation-based approach to learn likelihood surrogates from data. On data containing a Massive Black Hole Binary (MBHB) merger and simplified noise, we demonstrate that that SNL can provide flexible posterior estimation, in a manner that should scale well and remain reliable as realism is increased.

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