

Neural network interpolation of the magnetic field for the LISA Pathfinder Diagnostics Subsystem

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Abstract LISA Pathfinder is a science and technology demonstrator of the European Space Agency within the framework of its LISA mission, which aims to be the first space-borne gravitational wave observatory. The payload of LISA Pathfinder is the so-called LISA Technology Package, which is designed to measure relative accelerations between two test masses in nominal free fall. Its disturbances are monitored and dealt by the diagnostics subsystem. This subsystem consists of several modules, and one of these is the magnetic diagnostics system, which includes a set of four tri-axial fluxgate magnetometers, intended to measure with high precision the magnetic field at the positions of the test masses. However, since the magnetometers are located far from the positions of the test masses, the magnetic field at their positions must be interpolated. It has been recently shown that because there are not enough magnetic channels, classical interpolation methods fail to derive reliable measurements at the positions of the test masses, while neural

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