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Real Time Control Of Suspended Test Masses In Advanced Virgo Laser Interferometer

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Virgo seismic isolation system is composed by 10 complex mechanical structures named “Superattenuators”, or simply “Suspensions”, that isolate optical elements of Virgo interferometer from seismic noise at frequency larger than a few Hz. Each structure can be described by a model with 80 vibrational modes and is controlled by 24 coil-magnet pairs actuators. The suspension status is observed using 20 local sensors plus 3 global sensors available when the VIRGO interferometer is locked, that is when all optical lengths are controlled.

Since early beginning we made extensive use of digital control techniques implemented on custom Digital Signal Processor boards and software tools designed and developed within our group. With Advanced Virgo we are now at the third generation of Suspension Control Systems and our data conditioning, conversion and processing boards, developed in accordance with a custom variation of MicroTCA.4.

Results of our design and development efforts will be presented focusing mainly on real time issues and key performances of the overall system

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