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computer simulation of single parameter aging

In experimental studies of aging, the temperature T is externally controlled and identified as the phonon "bath"temperature measured on a thermometer.
Aging is a non-linear phenomenon. Thus the response of the system to a small perturbation is not linear and it depends on both sign and magnitude of input. For instance, consider small up temperature and down temperature jump to the same temperature (symmetry up and down jump). The two responses will not be mirror symmetric, the down jump will appear quite flat and reaching equilibrium much faster than the up jump. The up jump –while slower in the beginning –will show steeper approach to equilibrium. This is so called fictive temperature effect, an effect which comes from the fact that the relaxation rate is structure dependent and itself evolve with time. Our main purpose of this
study is to investigate the controlling parameter behind this effect in simulation as previously confirmed in experiments.
The TN-formalism interprets aging in terms of a material time, ξ. The material time maybe thought of as a time measured on a clock with a clock rate that changes as the system ages. The material time define from the clock rate γ(t) by dξ=γ(t)dt. Suppose a single parameter that controls both clock rate and measured quantity. The physical nature of this single parameter is irrelevant. If single parameter aging obeyed, it is possible to predict one jump from the relaxation function of another jump. Single parameter aging tests were derived by Hecksher et al.2015 for jumps that ending same temperature. Lisa et al.2018 tested single parameter aging either for ending to same temperature or to different temperature. Our main purpose is to study validity of single parameter aging theory by computer simulation.

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