More on McTaggart's AB series in physics

1. There's a difference between

(1) $\int_{t=0}^{T=4} L(t)dt$

and

(2) $\int_{t'=now}^{T'=4 \text{ minutes from } now} L(t')dt'$

and

(3) $\int_{2 \text{ minutes in the } future}^{2 \text{ minutes in the } past} L(t'')dt''$

where L may be regarded as a Lagrangian, or some other appropriate function. (3) is supposed to recognize that a system at a certain A-series time is first in my future, then in my present, then in my past. Assuming the dimensionality questions can be worked out, when are (1), (2), and (3) equal?

2. Let S_A be the A-series entropy of a system at the future time of $t = 4{:}19$ pm. It's an interesting possibility that S_A decreases as it goes from a system's future to its present to its past. Suppose the current time is 4:17. A system has more micro-states two minutes in the future that satisfy (present) constraints, on this view, than does S_A in the present. The answer depends at least on the the degree of actuality d of the possible worlds as systems further into the future are considered, and, if the future is branching, how so.

3. In the ontological models framework "there is some set Λ of ontic states that give a complete specification of the properties of the physical system as they exist in reality." (Leifer 2014), p. 82. Suppose to Bob Alice's ontic state space O_A is parameterized by a time variable $0 \leq t \leq 1$. To Alice, her ontic state space also parameterized by an A-series variable $1 \leq now_A \leq 0$.

There are 3 cases. 1. for Bob there is no such parameter as now_A, 2. for Bob there is such a parameter but it doesn't have a definite value, and 3. it has a definite value but it is unknown or unknowable to Bob, for some reason. (For the first, the ontic state space might be a union of two ordered sets.)