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Beyond complex Langevin equations:positive representation of Feynman path integrals directly in the Minkowski time

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A positive representation for an arbitrary complex, gaussian weight is derived and used to construct a statistical formulation of gaussian path integrals directly in the Minkowski time.

The positivity of Minkowski weights is achieved by doubling the number of real variables. The continuum limit of the new representation exists only if some of the additional couplings tend to infinity and are tuned in a specific way. The construction is then successfully applied to three quantum mechanical examples including a particle in a constant magnetic field – a simplest prototype of a Wilson line.

Further generalizations are shortly discussed and an intriguing interpretation of new variables is alluded to.

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