

Non-differentiable Dynamic: a possible dynamic in quantum gravity

V. Dzhunushaliev

*Dept. Theor. Phys., Kyrgyz State National University,
Bishkek, 720024, Kyrgyzstan*

and

*Institut fuer Mathematik, Universitaet Potsdam
PF 601553, D-14415 Potsdam, Germany*

Some non-differentiable quantities (for example, the metric signature) can be the independent physical degrees of freedom. It is supposed that in quantum gravity these degrees of freedom can fluctuate. The examples of such quantum fluctuation can be: a quantum interchange of the sign of two components of the 5D metric and a quantum fluctuation between Euclidean and Lorentzian metrics. The first case leads to a spin-like structure on the throat of composite wormhole. The second case leads to a quantum birth of the non-singular Euclidean Universe with frozen extra dimensions. The probability for such quantum fluctuations is connected with an algorithmical complexity of the gravity equations.