Nonsingular Big Bang solutions in nonlocal modified gravity

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After discovery of accelerating expansion of the Universe, there has been a renewed interest in gravity modification. One of promising approaches is nonlocal modification with the scalar curvature $R$ in the action replaced by a suitable function $F(R, \Box)$, where $\Box$ is the Laplace-Beltrami operator. In particular we analyze the modification in the form

$$S = \int \left( \frac{R - 2\Lambda}{16\pi G} + R^n R^q F(\Box) \right) \sqrt{-g} d^4 x$$

where $F(\Box)$ is an analytic function. We present a few $a(t)$ nonsingular bounce cosmological solutions for the above action using FLRW metric.

This is joint work with Branko Dragovich, Zoran Rakić and Jelena Stanković.