

We apply new global dynamical systems formulations to flat Robertson-Walker cosmology with a massless and massive Yang-Mills field with global $SO(3)$ symmetry, and a perfect-fluid with linear equation of state as the matter sources. For the pure Yang-Mills field the field equations can be reduced to an analytical two-dimensional unconstrained dynamical system on a compact state space, which is integrable in terms of elliptic functions, thus leading to a global visual picture of this well-known solution, including its asymptotics. We give rigorous proofs concerning global dynamics of the models including asymptotic source-dominance towards the past and future time directions.

We combine the proofs mentioned above with the global picture of the system to conclude that the system evolves from a radiation-dominated towards a matter-dominated form, it is also shown that the inflationary solution is not possible in this particular case