

CONTINUOUS TIME MARKOV CHAIN BASED APPROXIMATIONS OF
STATIONARY AND WEAK KAM HAMILTON–JACOBI EQUATIONS

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The paper is devoted to the study of stationary and weak KAM Hamilton–Jacobi equations. It investigates the rate at which solutions to the stationary Hamilton–Jacobi equation are approximated by the Bellman equation for a discounted Markov decision process, particularly in the limit as the discount factor tends to zero. The approximation of the effective Hamiltonian is also analyzed. Furthermore, the work establishes the convergence of both the functional components of the discrete weak KAM equations and the associated Mather measures.

This is a well-written paper that employs rigorous mathematics and reflects the author’s thorough familiarity with the relevant modern literature and may be accepted.

The following remarks will help readers to better understand the paper:

1. The paper focuses on the KAM Hamilton–Jacobi equation. While the KAM abbreviation is well-known to specialists in Hamilton–Jacobi theory, it would be helpful to decipher it upon its first use.
2. p.21, Lemma 7. It seems like there is a misprint: the constant c_7 is likely meant to be c_6 .
3. The paper needs a conclusion.
4. A minor revision for grammar and style is recommended.