ABSTRACT. The problem of identifying a stochastic matrix as a transition matrix between two fixed times, say $t = 0$ and $t = 1$, of a continuous-time and finite-state Markov chain has been shown to have practical importance, especially in the area of stochastic models applied to social phenomena. The embedding problem of finite Markov chains, as it is called, comes down to investigating whether the stochastic matrix can be expressed as the exponential of some matrix with row sums equal to zero and nonnegative off-diagonal elements. The aim of this paper is to answer a question left open by S. Johansen (1974), i.e., to characterize those stochastic matrices of order three with an eigenvalue $\lambda < 0$ of multiplicity 2.