1154-83-1305 **Arthur E Fischer*** (aef@ucsc.edu), Department of Mathematics, University of California, Santa Cruz, CA 95064. *Friedmann's Equation and the Creation of the Universe.*

We model the universe by the spatially flat ΛCDM (Lambda Cold Dark Matter) dimensionless scale factor

$$a_{\Lambda\text{CDM}}(t) = \Big(\frac{\Omega_{m,0}}{\Omega_{\Lambda,0}}\Big)^{1/3}\Big(\sinh\big(\tfrac{3}{2}\sqrt{\Omega_{\Lambda,0}}\,H_0 t\big)\Big)^{2/3}$$

which we *time-globalize* to all $t \in (\infty, \infty)$. This scale factor is C^∞ and *solves Friedmann's equation* for all $t \neq 0$ and is continuous with a cusp singularity at the big bang at $t = 0$. The resulting model is an *all-time time-symmetrical zero-energy single-bounce model of the universe*, which shows that encoded in Friedmann's equation is the prediction that the universe (1) existed *before* the big bang during the negative time epoch $(-\infty, 0)$; (2) asymptotically approaches de Sitter vacuum spacetime dS_4 as $t \to \pm\infty$; and (3) was created asymptotically from nothing at $t = -\infty$ and dies asymptotically to nothing at $t = +\infty$, with the time-globalized ΛCDM model interpolating between the initial and final asymptotic infinitely diluted vacuum states. Our results show that much can be said *classically* about the birth, big bang, and death of the universe *before* one needs to reach for *quantum* gravitational effects. (Received September 17, 2019)