

Solutions of the Einstein field equations with heat flow

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SAMS Subject Classification: Mathematical Physics

We study a shear-free spherically symmetric cosmological model with heat flow. The pivotal equation is given by:

$$VD_{uu} + 2D_u V_u - DV_{uu} = 0,$$

where V and D are metric functions. A method of generating solutions has been developed by Deng (1989) who found solutions to this equation when simple forms of V or D are chosen. We show a new approach to solve this equation. Significantly it is the first time that an explicit relationship between V and D is provided. This method also recovers Deng's solutions.