

> restart;with(Riemann):with(TensorPack): with(Canon):CDF(0): CDS(index):

Chapter XX Tensor analysis using indices - Senovilla et al. - Shearfree for acceleration parallel to vorticity if $\sigma_{ab}=0 \Rightarrow \omega \Theta = 0$

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eq64

> read "EFE" : read "SFE" :read "fids" :read "Seneqs80" :

proof of eq64:

We commence with eqs62 and 63

> eq[62] : T(%);

$$P^a_b \dot{d}u^b = -\frac{1}{6} \frac{(6\Psi^2 \mu p'' + 6\Psi^2 p p'' - 6\Psi^2 p^2 + 2\Psi^2 p' - 18p^3) du^a \theta}{\Psi^2 p'} \quad (1.1)$$
$$+ \frac{3}{2} \frac{p' \Psi_{;d} \omega^a_d}{\Psi}$$

> eq[63] : T(%);

$$P^a_b ddu^b = \left(\left(p' - \frac{2}{3} \right) \theta + \frac{\dot{d}Psi}{\Psi} \right) du^a \quad (1.2)$$

> eq[64] := omega[a, b]·Psi[-B]=0 : T(%);

$$\omega^a_b \Psi_{;b} = 0 \quad (1.3)$$

proof: This follows directly from eqs 62 and 63, taking into account the orthogonality of du[a] and omega[a,b]