> 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 $\sigma_{ab}=0 \Rightarrow \omega\Theta=0$
Author: Peter Huf
file 2d:eq58

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

proof of eq55:
We commence with time dilation of equation 56:

> $eq[58] := \text{P}[-a, c] \cdot P[-b, d] \cdot dotomega[-c,-d] = \left(`p'` - \frac{2}{3} \right) \cdot theta \cdot omega[-a,-b] : T(\%);$

$$P_a{}^c P_b{}^d \, dotomega_{cd} = \left(p' - \frac{2}{3} \right) \theta \, \omega_{ab} \qquad (1.1)$$

proof:
****
****
We commence with eq21:

> $temp := eq[21] : T(\%);$

$$P_a{}^c P_b{}^d \, dotomega_{cd} + \frac{2}{3} \theta \, \omega_{ab} - \frac{1}{2} P_a{}^c P_b{}^d \, du_{d;c} + \frac{1}{2} P_b{}^c P_a{}^d \, du_{d;c} = 0 \qquad (1.2)$$

> $eq[54] : T(\%);$

$$-\frac{1}{2} P_a{}^c P_b{}^d \, du_{d;c} + \frac{1}{2} P_b{}^c P_a{}^d \, du_{d;c} = p' \theta \, \omega_{ab} \qquad (1.3)$$

and we define

> $temp2 := TEDS(eq[54], temp) : T(\%);$

$$P_a{}^c P_b{}^d \, dotomega_{cd} + \frac{2}{3} \theta \, \omega_{ab} + p' \theta \, \omega_{ab} = 0 \qquad (1.4)$$

> $convert(temp2, string);$

"P[-a,c]*P[-b,d]*dotomega[-c,-d]+2/3*theta*omega[-a,-b]+`p'`*theta*omega[-a,-b] = 0"   **(1.5)**

> $eq[58] := temp2 : T(\%);$

$$P_a{}^c P_b{}^d \, dotomega_{cd} + \frac{2}{3} \theta \, \omega_{ab} + p' \theta \, \omega_{ab} = 0 \qquad (1.6)$$

>