

# S.V.T. Decomposition in Conformal to Flat Space

$$h_{00} = -2\phi$$

$$h_{0i} = w_i = \partial_i B - B_i$$

$$h_{ij} = -2\psi + S_{ij} = -2\psi + 2\partial_i \partial_j E + \partial_i E_j + \partial_j E_i + 2E_{ij}$$

where

$$\partial_i B^i = \partial_i E^i = 0$$

$$\partial_i E^{ij} = 0$$

$$\delta_{ij} E^{ij} = 0$$

(Same as Ellis Relativistic Cosmology, apart from  $E_{ij}$ )

$\Omega=1$  Gauge invariant quantities:

$$\psi = \psi$$

$$\mathcal{P} = \phi + \partial_0 B - \partial_0 \partial_0 E$$

$$\mathcal{F}_i = \partial_0 E_i + B_i$$

$$E_{ij} = E_{ij}$$

$\Omega=\Omega(t)$  Gauge invariant quantities are given in Ellis

$$\delta G_{\mu\nu}$$

$$\Omega = 1$$

00	$-2\nabla^2\psi$
11	$(-2\partial_0\partial_0-\partial_1\partial_1+\nabla^2)\psi - (\nabla^2-\partial_1\partial_1)(\phi+\partial_0B-\partial_0\partial_0E) - \partial_1\partial_0(B_1+\partial_0E_1) + \square E_{11}$
22	$(-2\partial_0\partial_0-\partial_2\partial_2+\nabla^2)\psi - (\nabla^2-\partial_2\partial_2)(\phi+\partial_0B-\partial_0\partial_0E) - \partial_2\partial_0(B_2+\partial_0E_2) + \square E_{22}$
33	$(-2\partial_0\partial_0-\partial_3\partial_3+\nabla^2)\psi - (\nabla^2-\partial_3\partial_3)(\phi+\partial_0B-\partial_0\partial_0E) - \partial_3\partial_0(B_3+\partial_0E_3) + \square E_{33}$
01	$-2\partial_1\partial_0\psi + \frac{1}{2}\nabla^2(B_1+\partial_0E_1)$
02	$-2\partial_2\partial_0\psi + \frac{1}{2}\nabla^2(B_2+\partial_0E_2)$
03	$-2\partial_3\partial_0\psi + \frac{1}{2}\nabla^2(B_3+\partial_0E_3)$
12	$-\partial_2\partial_1\psi + \partial_2\partial_1(\phi+\partial_0B-\partial_0\partial_0E) - \frac{1}{2}\partial_1\partial_0(\partial_0E_2+B_2) - \frac{1}{2}\partial_2\partial_0(\partial_0E_1+B_1) + \square E_{12}$
13	$-\partial_3\partial_1\psi + \partial_3\partial_1(\phi+\partial_0B-\partial_0\partial_0E) - \frac{1}{2}\partial_1\partial_0(\partial_0E_3+B_3) - \frac{1}{2}\partial_3\partial_0(\partial_0E_1+B_1) + \square E_{13}$
23	$-\partial_3\partial_2\psi + \partial_3\partial_2(\phi+\partial_0B-\partial_0\partial_0E) - \frac{1}{2}\partial_2\partial_0(\partial_0E_3+B_3) - \frac{1}{2}\partial_3\partial_0(\partial_0E_2+B_2) + \square E_{23}$

