```
t,x = var('t x')

# Creamos una variedad de dimension 2
M = Manifold(2, 'M', structure='Lorentzian')
print(M)

#Espacio "original" en t,x
X.<t,x> = M.chart('t x')
X_f = X.frame()
print(f'X frame: {X_f}')
g = M.metric()
g[0,0] = -1
g[1,1] = 1
print(g[:])

# Transformacion hacia psi,zeta
psi,zeta = var('psi zeta')
PZ.<psi,zeta> = M.chart('psi zeta')
print(f'PZ: {PZ}')

transformation = PZ.transition_map(X, [1/2*tan(1/2*(psi+zeta))- 1/2*tan(1/2*(psi-zeta)), 1/2*tan(1/2*(psi+zeta))+ 1/2*tan(1/2*(psi-zeta))])
transformation.set_inverse(atan(t+x)+atan(t-x),atan(t+x)-atan(t-x))
print(f'frame: {PZ.frame()}')
print(latex(g.display(PZ)))
print(f'g[0,0]: {latex(g[PZ.frame(),0,0])}')
print(f'g[1,1]: {latex(g[PZ.frame(),1,1])}')
```

Se logró calcular la metrica pero la expresion es extremadamente larga y no se logró identificar el facto omega.
A continuacion dejo el resultado que se obtuvo para g en formato latex:

$$g = \left(\frac{\cos\left(\frac{1}{2}\,\zeta\right)^{4} - 2\,\cos\left(\frac{1}{2}\,\zeta\right)^{2}\sin\left(\frac{1}{2}\,\psi\right)^{2} + \sin\left(\frac{1}{2}\,\psi\right)^{4}}{4\left(\cos\left(\frac{1}{2}\,\psi\right)^{8}\cos\left(\frac{1}{2}\,\zeta\right)^{8} - 4\,\cos\left(\frac{1}{2}\,\psi\right)^{6}\cos\left(\frac{1}{2}\,\zeta\right)^{6}\sin\left(\frac{1}{2}\,\psi\right)^{2}\sin\left(\frac{1}{2}\,\zeta\right)^{2} + 6\,\cos\left(\frac{1}{2}\,\psi\right)^{4}\cos\left(\frac{1}{2}\,\zeta\right)^{4}\sin\left(\frac{1}{2}\,\psi\right)^{4}\sin\left(\frac{1}{2}\,\zeta\right)^{4} - 4\,\cos\left(\frac{1}{2}\,\psi\right)^{2}\cos\left(\frac{1}{2}\,\zeta\right)^{2}\sin\left(\frac{1}{2}\,\psi\right)^{6}\sin\left(\frac{1}{2}\,\zeta\right)^{6} + \sin\left(\frac{1}{2}\,\psi\right)^{8}\sin\left(\frac{1}{2}\,\zeta\right)^{8}\right)}\right) \mathrm{d}\psi$$

$$+ \left(-\frac{\cos\left(\frac{1}{2}\,\zeta\right)^{4} - 2\,\cos\left(\frac{1}{2}\,\zeta\right)^{2}\sin\left(\frac{1}{2}\,\psi\right)^{2} + \sin\left(\frac{1}{2}\,\psi\right)^{4}}{4\left(\cos\left(\frac{1}{2}\,\psi\right)^{8}\cos\left(\frac{1}{2}\,\zeta\right)^{8} - 4\,\cos\left(\frac{1}{2}\,\psi\right)^{6}\cos\left(\frac{1}{2}\,\zeta\right)^{6}\sin\left(\frac{1}{2}\,\psi\right)^{2}\sin\left(\frac{1}{2}\,\zeta\right)^{2} + 6\,\cos\left(\frac{1}{2}\,\psi\right)^{4}\cos\left(\frac{1}{2}\,\zeta\right)^{4}\sin\left(\frac{1}{2}\,\psi\right)^{4}\sin\left(\frac{1}{2}\,\zeta\right)^{4} - 4\,\cos\left(\frac{1}{2}\,\psi\right)^{2}\cos\left(\frac{1}{2}\,\zeta\right)^{2}\sin\left(\frac{1}{2}\,\psi\right)^{6}\sin\left(\frac{1}{2}\,\zeta\right)^{6} + \sin\left(\frac{1}{2}\,\psi\right)^{8}\sin\left(\frac{1}{2}\,\zeta\right)^{8}\right)}\right) \mathrm{d}\zeta$$

$$g[0,0] : \frac{1}{4\left(4\left(4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{4} - 4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{2} + 1\right)\cos\left(\frac{1}{2}\,\arctan\left(t+x\right)\right)^{4} + 4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{4} - 4\left(4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{4} - 4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{2} + 1\right) \cdots}$$

$$g[1,1] : -\frac{1}{4\left(4\left(4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{4} - 4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{2} + 1\right)\cos\left(\frac{1}{2}\,\arctan\left(t+x\right)\right)^{4} + 4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{4} - 4\left(4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{4} - 4\,\cos\left(\frac{1}{2}\,\arctan\left(-t+x\right)\right)^{2} + 1 \cdots}$$