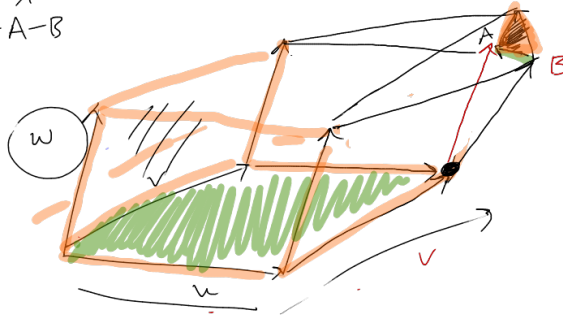


Comments on Ch. 31 exercises

#10: symmetries of Riem. Tensor

(i)

$$\underbrace{R(u,v)w}_{\substack{\text{M.A-B} \\ \text{M.A-B}}} + R(v,w)u + R(w,u)v = 0 \Leftrightarrow R_{ijk} + R_{jki} + R_{kij} = 0$$



$$\sum_{i=1}^3 u_i e_i = u_1 e_1 + u_2 e_2 + u_3 e_3 = u^i e_i$$

repeated indices
top / bottom
are summed
 $u^i e_j$

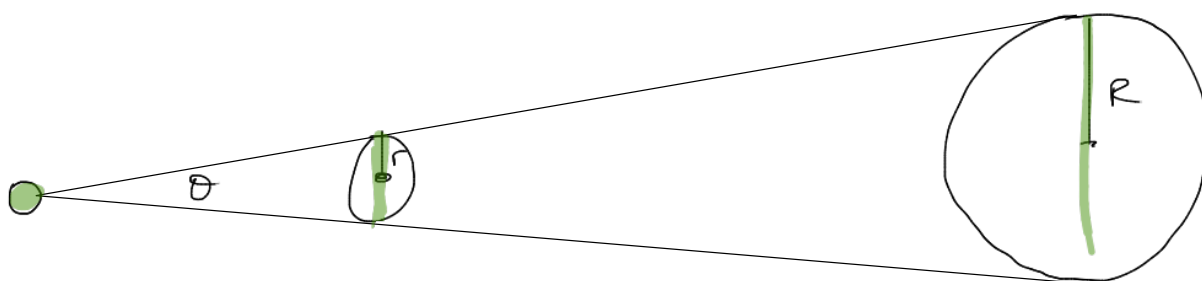
#1/ Counting Components of Tensor —

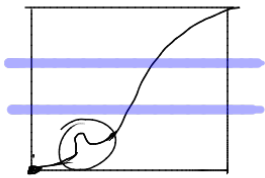
$$R(u, v, w) \cdot v$$

3-metric $\nearrow \nearrow \nearrow \nearrow$
3-coord

$3^4 = 81$ potential #'s to describe.

symmetries $\Rightarrow$
cut down to 6





$$\begin{aligned}x &= f(\theta, \phi) \\ y &= g(\theta, \phi) \\ z &= h(\phi)\end{aligned}$$

$$\text{bump function} = \begin{cases} e^{\frac{-1}{1-t^2}} & |t| < 1 \\ 0 & |t| \geq 1 \end{cases}$$



Non-generic, but holonomy
was ① — how/why?