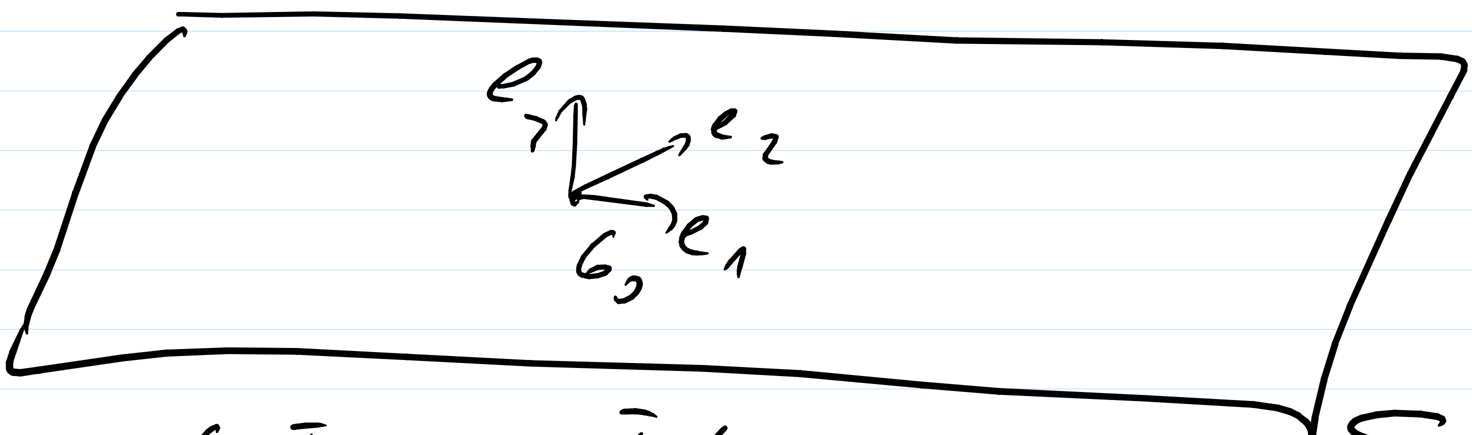
Note Title 2/14/2014

The gauge fixing formulation



Σ - 3d

fix (z^I), $z^I(\sigma_0) = 0$

$\partial_I = e_I\big|_{\sigma_0}$ $\qquad z^1 = r\cos\varphi\sin\theta$

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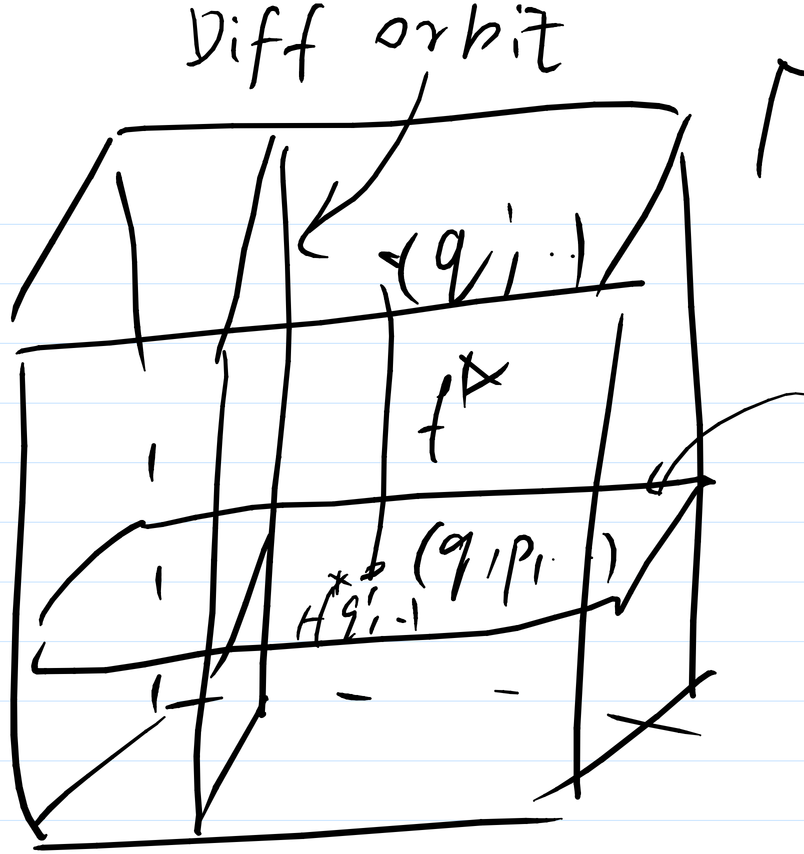


Γ

$$\begin{cases} Y_q^r(\sigma) = r(\sigma) \\ Y_q^A(\sigma) = \theta^A(\sigma) \end{cases}$$

$$Q_{AB}(r,\theta)\Big|_{(q',p',\ldots)} = f^* q'_{AB}(r,\theta)$$

$$\vert\vert\vert$$

$$\begin{cases} q_{rr} = \Phi \\ q_{rA} = 0 \end{cases}$$

Diff_{6_0} generated by $N^I \partial_I$ s.t.

Apesidnal Diff — $N^I{}_{,J}(6_0) = \begin{bmatrix} * & 0 \\ * & * \end{bmatrix}$

$X^I \partial_I$ $\qquad X_{r;r} = 0 = X_{(r;A)}\big|_q$

$$\begin{cases} \partial_r X^r = 0 \\ \partial_r X^A = -q^{AB} \partial_B X^r \end{cases}$$

$X^I(6_0)$

$X^I{}_{,J}(6_0)$ s.t.

$X_{I,J}(6_0) = -X_{J,I}(6_0)$

rigit rotations: $X^I(\sigma_0) = 0$

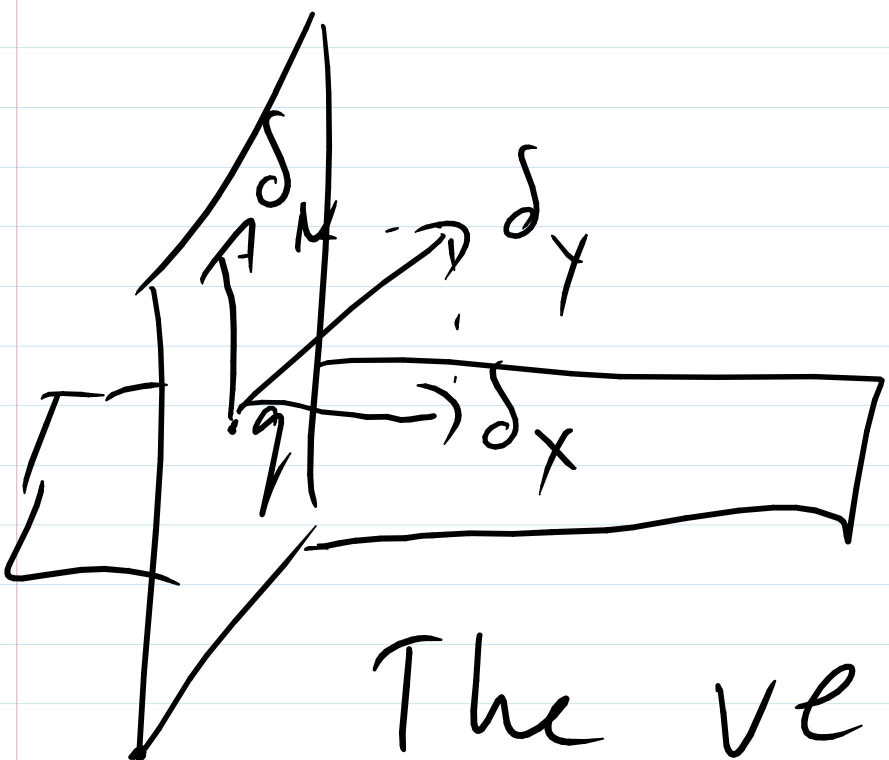
$$r' = r, \quad \theta'^A = R^A{}_B \theta^B$$

transtions: $X^I{}_{,J}(\sigma_0) = 0$

<u>Unique decomposition</u>

$$\underset{\text{given}}{Y^I}\partial_I = N^I \partial_I + X^I \partial_I$$

$$N_{r;r} \overset{!}{=} Y_{r;r} \,, \quad N_{(r;A)} \overset{!}{=} Y_{(r;A)}$$



The vector constr

$$\partial_r P^r{}_A(r,\theta) = -\mathcal{D}_B P^B{}_A - \frac{1}{2} C^{\mathrm{matt}}_A$$

$$\partial_r P^r{}_r(r,\theta) = \frac{1}{2} g_{AB|r} P^{AB} - \mathcal{D}_A P^A{}_r - \frac{1}{2} C^m_r$$

given $Q_{AB}(r,\theta)$, $p^{AB}(r,\theta)$, matt

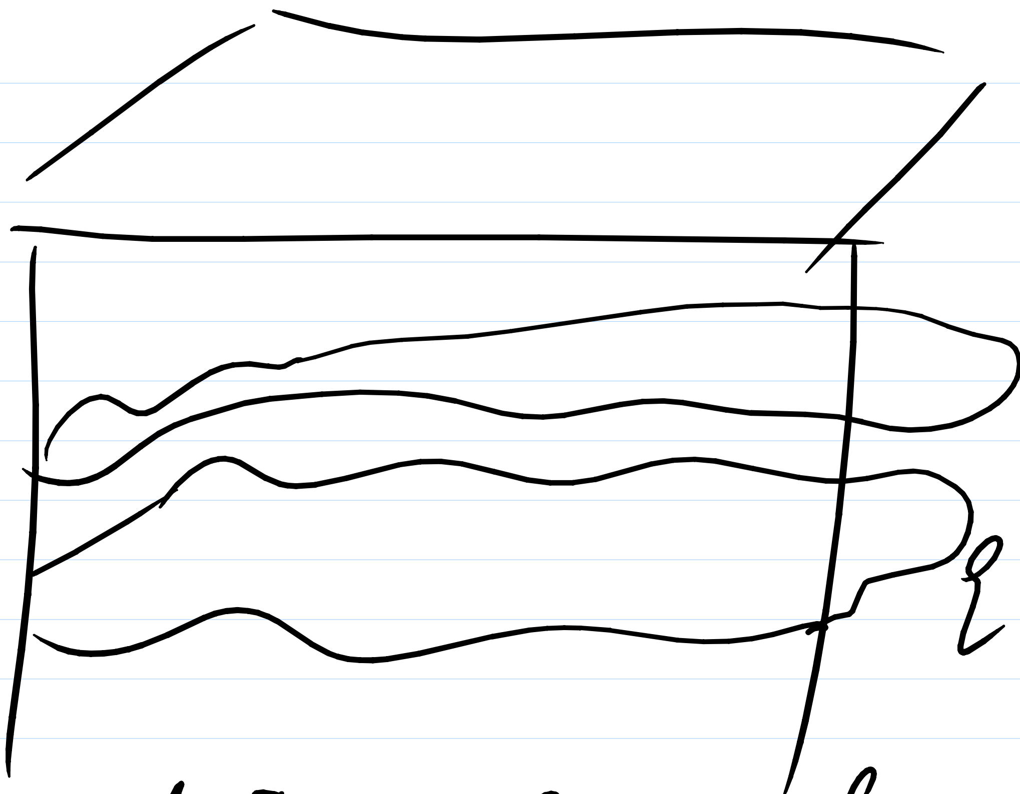
unique $\boxed{p^{rA}, p^{rr}}(Q_{AB}, p^{AB}, \ldots)$

The meaning of $\{\cdot, p^{rr}(r,\theta)\}$

$p^{rr}, p^{rA} \longleftrightarrow \{\underset{1}{\underset{\shortparallel}{g_{rr}}}, \underset{0}{\underset{\shortparallel}{g_{rA}}}\}$ $\{\cdot, p^{rA}(r,\theta)\}$

translations

$\cancel{g_{rr} = \ldots}$



$\{\cdot, P^{rr}\}$

$\{\cdot, P^{rA}\}$

$\xi_{rr} = 1, \ \xi_{rA} = 0$

$$\left\{ \Phi(r,\theta), \int f_{rr} P^{rr} + 2 f_{rA} P^{rA} \right\} =$$

$$= - N^r \partial_r \Phi(r,\theta) - N^A \partial_A \Phi(r,\theta)$$

use th $2I$ coord:

'6,

$$\{\quad P^{IJ}(x^I),\ Q_{IJ}(x^I)$$

$$\{\ ',\ \int f_{IJ} P^{IJ}(x^I)\}$$

$$\{\ ',\ P^{IJ}(x^I)\} = f(x^I)^{IJ}\,\delta(x^I,0) + \ldots$$

<u>The Hamiltonian</u>

$$H = \int h(q, p, \phi, \pi)\, d^3x$$

$$\{F(r, \theta), H\} = \{f(r, \theta), H\}\Big|_{f' \mapsto F'} + $$

$$- \mathcal{L}_N F(r, \theta)$$

$$N = N\left(\int_0^r \frac{\partial h}{\partial p^{ri}} \cdots, \int_0^r \int_0^{r'} \frac{\partial h}{\partial p^{rx}} \cdots, \int_0^r \frac{\partial h}{\partial p^{rA}}, \frac{\partial h}{\partial p^{IJ}(6)} \right)$$

$F(r, \theta)$

6_0