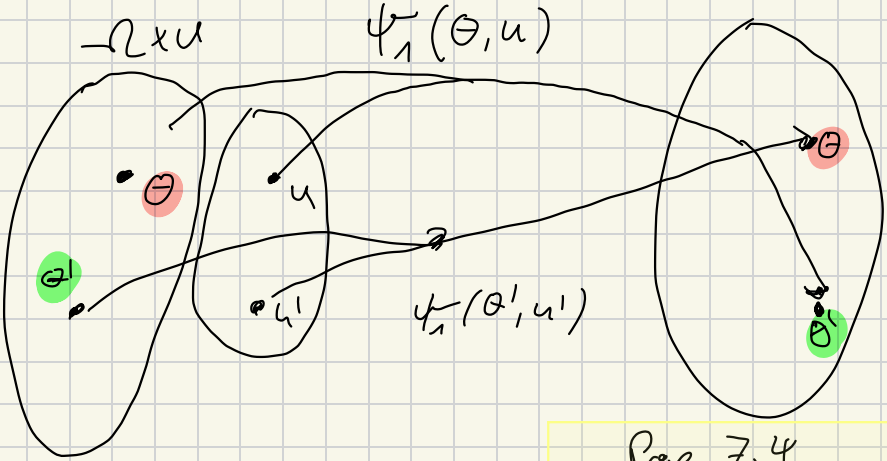
Visualization of Proposals from Transformations

$$\psi_1 : \Omega \times U \longrightarrow \Omega$$



$$\theta = \psi_1\Big(\overbrace{\psi_1(\theta, u)}^{\theta'}, u'\Big)$$

u is the proposal variable

ψ_1 is the proposal function

Prop. 7.4

cond. Distribution of θ' given θ is given at $\psi_1(\theta, u) = \theta'$ as

$$q(d\theta' \mid \theta) = g(u)\, du$$

Density for θ'

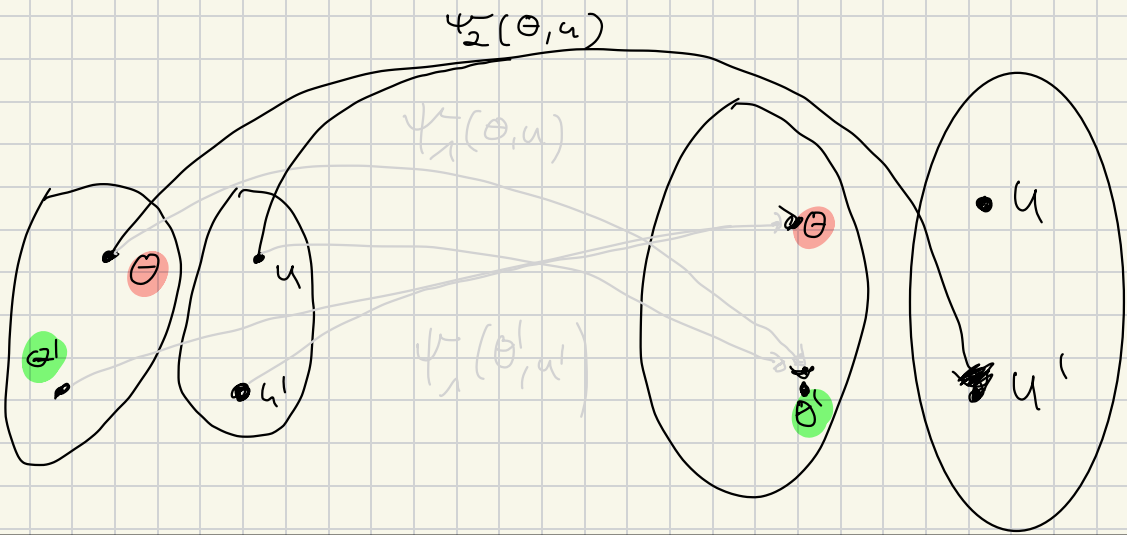
$$q(\theta' \mid \theta) = g(u) \left| \frac{\partial \theta'}{\partial u} \right|^{-1}$$

We require a unique $u' \in \mathcal{U}$ s.t that $\theta = \psi_1(\theta', u')$.

$\psi_2 : \Omega \times \mathcal{U} \to \mathcal{U}$

u' : proposed variable for reverse update

$u' = \psi_2(\theta, u)$



$\psi : (\Omega \times \mathcal{U}) \longrightarrow (\Omega \times \mathcal{U})$

$\psi(\psi_1, \psi_2)$ is an involution

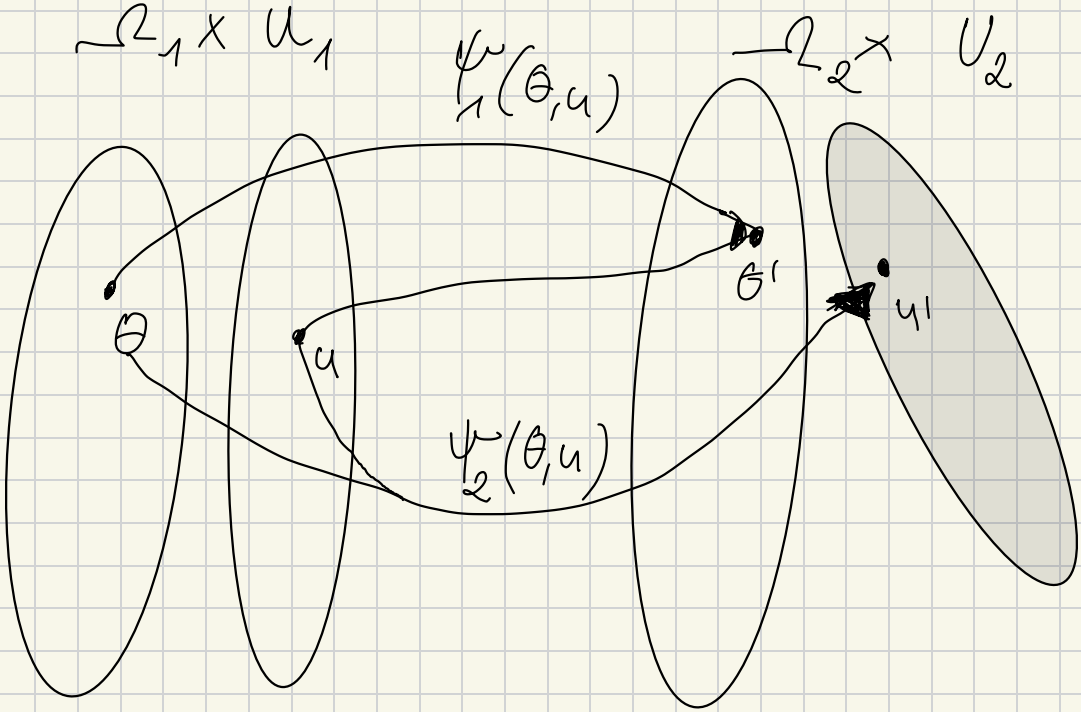
$(\theta, u) = \psi(\psi(\theta, u))$

Now considering

$u \in U_1 \qquad u \sim g_1$

$u' \in U_2 \qquad u \sim g_2$

$\theta' = \psi_1(\theta, u) \qquad u' = \psi_2(\theta, u)$



$\psi : (\Omega_1 \times U_1) \times (\Omega_2 \times U_2) \to (\Omega_1 \times U_1) \cup (\Omega_2 \times U_2)$

$\psi = \psi(\psi_1, \psi_2)$