

Finally we insert into formula:-

$$p_u(x)(u) = p(x(u)) \cdot \det\left(\frac{dx(u)}{du}\right)$$

~~$$= 1 \cdot \frac{1}{\sqrt{2\pi}}$$~~

$$= 1 \cdot \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{1}{2}(u_1^2 + u_2^2)}$$

$$= \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{u_1^2}{2}} + \frac{1}{\sqrt{2\pi}} e^{-\frac{u_2^2}{2}}$$

Normal distribution with
 $\sigma = \sigma^2 = 1$ and $\mu = 1$