3D direction – cosine distribution

- cosine distribution with respect to solid angle

$$\begin{cases} \mathbf{r} \in [0,1]^2 \\ \mathbf{r} \sim 1 \end{cases} \Rightarrow \begin{cases} \varphi = 2\pi r_x \\ \theta = \arccos\left(\sqrt{r_y}\right) \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} \mathbf{d} = \left(\sqrt{1-r_y}\cos(2\pi r_x), \sqrt{1-r_y}\sin(2\pi r_x), \sqrt{r_y}\right) \\ \mathbf{d} \sim \dfrac{\cos(\theta)}{\pi} \end{cases}$$

