

3D direction – cosine distribution

- cosine distribution with respect to solid angle

$$\begin{aligned} \left\{ \begin{array}{l} \mathbf{r} \in [0,1]^2 \\ \mathbf{r} \sim 1 \end{array} \right. &\Rightarrow \left\{ \begin{array}{l} \varphi = 2\pi r_x \\ \theta = \arccos(\sqrt{r_y}) \end{array} \right. \Rightarrow \\ &\Rightarrow \left\{ \begin{array}{l} \mathbf{d} = (\sqrt{1-r_y} \cos(2\pi r_x), \sqrt{1-r_y} \sin(2\pi r_x), \sqrt{r_y}) \\ \mathbf{d} \sim \frac{\cos(\theta)}{\pi} \end{array} \right. \end{aligned}$$

Kilde: http://www.cs.dartmouth.edu/~fabio/teaching/cs52-winter08/lectures/15_MonteCarloIntegration_Web.pdf