$$\phi_X(t) = E(e^{tX}) = \int_{-\infty}^{\infty} e^{tx} f_X(x)\,dx$$

$$f_X(x) = x^{n/2-1} e^{-x/2} \times \frac{1}{2^{n/2}\Gamma(n/2)} \rightarrow c$$

$$= c\int_0^{\infty} e^{tx} x^{n/2-1} e^{-x/2}\,dx$$

$$= c\int_0^{\infty} x^{n/2-1} e^{-\left(\frac{1}{2}-t\right)x}\,dx \qquad y = \left(\frac{1}{2}-t\right)x$$

$$dy = \left(\frac{1}{2}-t\right)dx$$

$$= c\int_0^{\infty} \left(\frac{2y}{1-2t}\right)^{\frac{n}{2}-1} e^{-y}\,dy\,\frac{2}{1-2t}$$

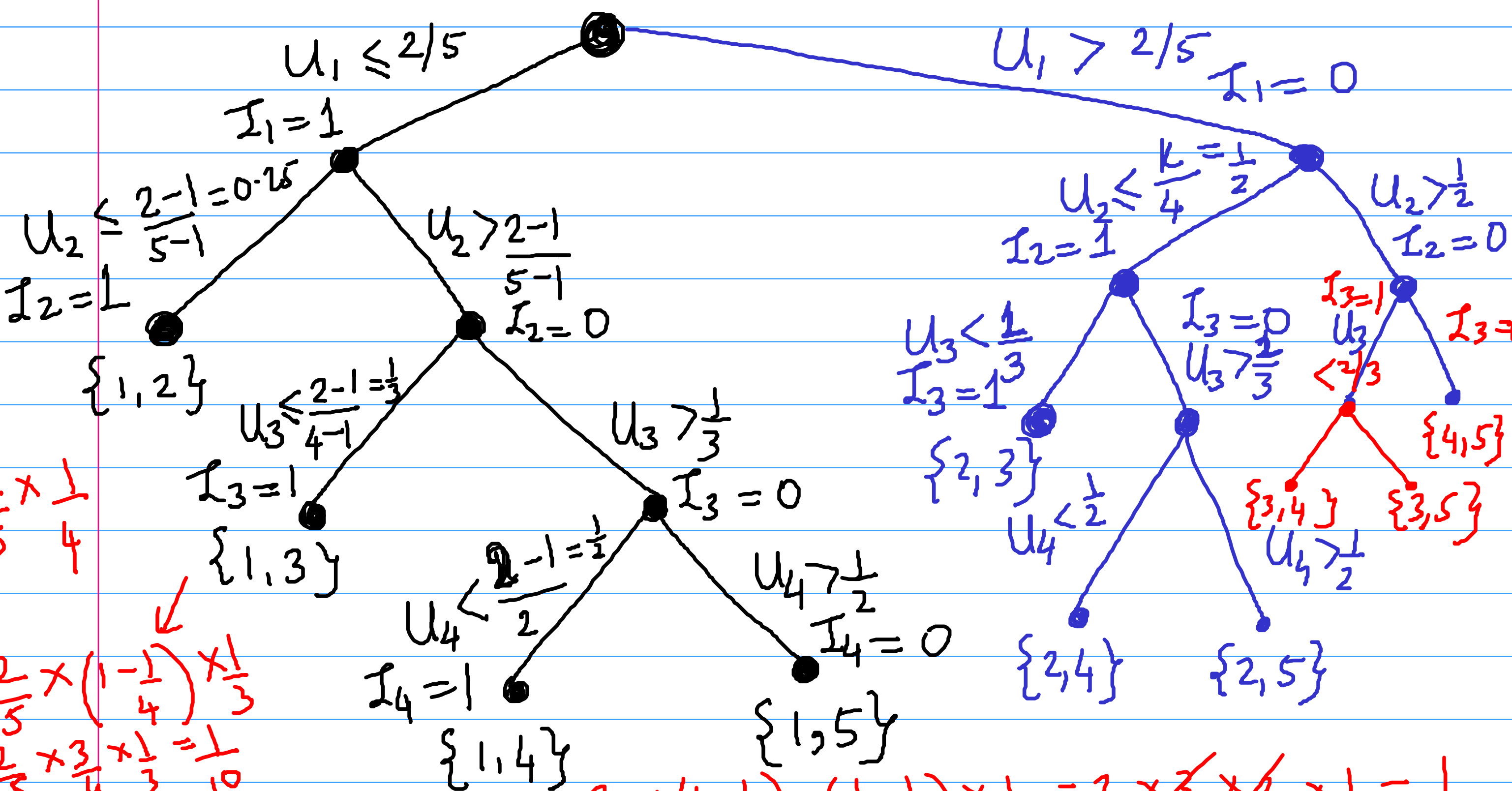
$$= c\int_0^{\infty} \frac{2^{n/2}}{(1-2t)^{n/2}} y^{n/2-1} e^{-y}\,dy$$

$$= c\left(\frac{2}{1-2t}\right)^{n/2} \int_0^{\infty} y^{n/2-1} e^{-y}\,dy \quad \Gamma(n/2)$$

$$= \frac{1}{\cancel{2^{n/2}}\cancel{\Gamma(n/2)}} \frac{\cancel{2^{n/2}}}{(1-2t)^{n/2}} \cancel{\Gamma(n/2)} = (1-2t)^{-n/2}$$

$$A = \{1, 2, 3, 4, 5\}$$

$n = 5$ elements $\quad k = 2$ elements.



$$\frac{2}{5} \times \frac{1}{4}$$

$$\frac{2}{5} \times \left(1 - \frac{1}{4}\right) \times \frac{1}{3} = \frac{2}{5} \times \frac{3}{4} \times \frac{1}{3} = \frac{1}{10}$$

$$\frac{2}{5} \times \left(1 - \frac{1}{4}\right) \times \left(1 - \frac{1}{3}\right) \times \frac{1}{2} = \frac{2}{5} \times \frac{\cancel{3}}{4} \times \frac{\cancel{2}}{\cancel{3}} \times \frac{1}{\cancel{2}} = \frac{1}{10}$$

Prob. of generating any given set $= \dfrac{1}{C(5,2)}$

$$= \frac{3!\,2!}{5!} = \frac{\cancel{3!}\,2!}{5 \times 4 \times \cancel{3!}} = \frac{1}{10}$$