Lec 5: Risk Pooling in Insurance

- If *n* policies, each has independent probability *p* of a claim, then the number of claims follows the binomial distribution. The standard deviation of the fraction of policies that result in a claim is
- Probability that fraction of policies that result in loss will lie between P1 and P2, using Excel Normdist

$$f(x) = P^{x}(1-P)^{(n-x)} n! / (x!(n-x)!)$$

$$\sigma = \sqrt{p(1-p)/n}$$

Normdist(*P*2. *P*. σ .1) – *Normdist*(*P*1, *P*, σ ,1) Open Yale courses

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Example

- If probability of loss is .2, I write 100 policies, then expected number of losses is 20% and the standard deviation σ of the fraction of losses is (.2*0.8/100)^{.5}=.04
- Change n to 1000, get σ =.013
- Change *n* to 10000, get σ =.004

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