Formler og tabeller for statistikk

1 Sannsynlighetsregning

Generell addisjonssetning

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Betinget sannsynlighet

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

Gen. multiplikasjonsregel

$P(A \cap B) = P(B) \cdot P(A|B)$
$P(A \cap B) = P(A) \cdot P(B|A)$

Total sannsynlighet

$$P(A) = \sum_{i=1}^{r} P(B_i) \cdot P(A|B_i)$$

Bayes lov

$$P(B|A) = \frac{P(B) \cdot P(A|B)}{P(A)}$$

Hvis A og B uavhengige

$P(A \cap B) = P(A) \cdot P(B)$
$P(A|B) = P(A)$
$P(B|A) = P(B)$

2 Kombinatorikk

Antall forskjellige utvalg når s enheter trekkes fra en populasjon på N enheter:

Ordnet utvalg med tilbakelegging

N^s

Ordnet utvalg uten tilbakelegging

$$(N)_s = N(N-1)...(N-s+1) = \frac{N!}{(N-s)!}$$

Uordnet utvalg uten tilbakelegging

$$\binom{N}{s} = \frac{(N)_s}{s!} = \frac{N!}{s!(N-s)!}$$

3 Sannsynlighetsfordelinger generelt (1 variabel)

Fordelingsfunksjon

Diskret	Kontinuerlig
$F(x) = P(X \leq x)$	$F(x) = \int_{-\infty}^{x} f(u)du$
$P(a < X \leq b) = F(b) - F(a)$	$f(x) = \frac{d}{dx}F(x)$

Forventing

Diskret

$$\mu = E(X) = \sum_x x \cdot P(X = x)$$

$$E[g(X)] = \sum_x g(x) \cdot P(X = x)$$

Kontinuerlig

$$\mu = E(X) = \int_{-\infty}^{\infty} x \cdot f(x)dx$$

$$E[g(X)] = \int_{-\infty}^{\infty} g(x) \cdot f(x)dx$$

Varians

Diskret

$$\sigma^2 = \mathrm{Var}(X) = E[(X-\mu)^2] = E(X^2) - \mu^2$$

$$= \sum x^2 P(X = x)) - \mu^2$$

Kontinuerlig

$$\sigma^2 = \mathrm{Var}(X) = \int_{-\infty}^{\infty} (x-\mu)^2 \cdot f(x)dx$$

Standardavvik

$$\sigma = SD(X) = \sqrt{Var(X)}$$

4 Regler for forventing og varians

$E(aX + b) = aE(X) + b$

$E(X_1 + X_2) = E(X_1) + E(X_2)$

$\mathrm{Var}(aX + b) = a^2\mathrm{Var}(X)$

$\mathrm{Var}(X_1 + X_2) = \mathrm{Var}(X_1) + \mathrm{Var}(X_2)$ (når X_1 og X_2 er uavhengige.)

5 Sannsynlighetsfordelinger generelt (2 variable)

Simultanfordeling for X og Y

$P[(X = x) \cap (Y = y)]$

Forventning

$E[g(X,Y)] = \sum_x \sum_y g(x,y) \cdot P[(X = x) \cap (Y = y)]$

Kovarians

$\text{Cov}(X,Y) = E[(X - \mu_1)(Y - \mu_2)] = E(X \cdot Y) - \mu_1 \cdot \mu_2$

Korrelasjonskoeffisient

$\rho(X,Y) = \frac{\text{Cov}(X,Y)}{\sigma_1 \cdot \sigma_2}$

6 Diskrete sannsynlighetsfordelinger

Binomisk fordeling

$X \sim \text{bin}(n,p)$:

$P(X = x) = \binom{n}{x} \cdot p^x \cdot (1-p)^{n-x}$

$E(X) = np$

$\text{Var}(X) = np \cdot (1-p)$

Poissonfordeling

$X \sim Po(\lambda) = Po(\alpha \cdot t)$:

$P(X = x) = \frac{\lambda^x}{x!} \cdot e^{-\lambda}$

$E(X) = \lambda$

$\text{Var}(X) = \lambda$

7 Kontinuerlige sannsynlighetsfordelinger

Normalfordelingen

$X \sim N(\mu, \sigma^2)$:

$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$

$F(x) = P(X \leq x) = G(\frac{x-\mu}{\sigma})$

Standard normalfordeling

$X \sim N(0,1)$:

$F(x) = P(X \leq x) = G(x)$

$G(-x) = 1 - G(x)$

Exponensialfordelingen

$T \sim \exp(\alpha)$:

$f(t) = \alpha \cdot e^{-\alpha t}$ for t > 0

$F(t) = 1 - e^{-\alpha t}$ for t > 0

$E(T) = \frac{1}{\alpha}$

$\text{Var}(T) = \frac{1}{\alpha^2}$

Weibullfordelingen

$T \sim \mathcal{W}(\beta, \eta)$:

$f(t) = \frac{\beta}{\eta^\beta} t^{\beta-1} e^{-(t/\eta)^\beta} \quad t \geq 0$

$F(t) = 1 - e^{-(t/\eta)^\beta} \quad t \geq 0$

$E(T) = \eta \cdot \Gamma(1 + \frac{1}{\beta})$

$\text{Var}(T) = \eta^2 \left(\Gamma(1 + \frac{2}{\beta}) - \Gamma(1 + \frac{1}{\beta})^2\right)$

$\mathcal{W}(1, \eta) = \exp(1/\eta)$

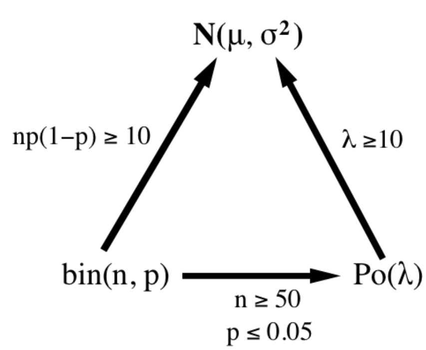
Utvidet Weibullfordelingen

$T \sim \mathcal{W}(\beta, \eta, \gamma)$:

$f(t) = \frac{\beta}{\eta^\beta}(t-\gamma)^{\beta-1} e^{-((t-\gamma)/\eta)^\beta} \quad t \geq \gamma$

$F(t) = 1 - e^{-((t-\gamma)/\eta)^\beta} \quad t \geq \gamma$

8 Tilnærminger



Sentralgrensesetningen

Dersom X_1, X_2,...,X_n er uavhengige og identisk fordelte stokastiske variable med forventing μ og varians σ^2, så er for *store* verdier av n (n $\geq$ 30):

1) $X_1 + X_2 + ... + X_n \approx N(n\mu, n\sigma^2)$

2) $\overline{X} = \frac{1}{n}(X_1 + X_2 + ... + X_n) \approx N(\mu, \frac{\sigma^2}{n})$

9 Punktestimering

Punktestimator for forventing

$$\hat{\mu} = \overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$$

$$E(\hat{\mu}) = \mu \quad \text{Var}(\hat{\mu}) = \frac{\sigma^2}{n}$$

Punktestimator for varians

$$S^2 = \frac{1}{n-1}\sum_{i=1}^{n}(X_i - \overline{X})^2 = \frac{1}{n-1}\left(\sum_{i=1}^{n} X_i^2 - n\overline{X}^2\right)$$

$$E(S^2) = \sigma^2$$

Bernards approksimasjon

Vi gjør n målinger av en stokastisk variabel X. La $F(x) = P(X \leq x)$. Målingene sorteres med hensyn på x. Dersom måling nr. i assosieres med x_i, har vi:

$$\widehat{F(x_i)} = \frac{i - 0.3}{n + 0.4}$$

10 Hypotesetesting

Signifikanssannsynlighet - "p-verdi"

Sannsynligheten for å få et resultat som er lik eller mer ekstrem enn den observerte verdien, gitt at H_0 er sann.

Styrkefunksjonen

$$\beta(\theta) = P(\text{"Påstå H}_1\text{"}|\theta)$$

Hypotesetesting med kjent σ

Antar normalfordelte, eller tilnærmet normalfordelte observasjoner:

(1-α)·100 % Konfidensintervall for μ

$$\overline{X} \pm u_{\frac{\alpha}{2}} \cdot \frac{\sigma}{\sqrt{n}}$$

Utvalgsstørrelse

$$n = \left(\frac{u_{\frac{\alpha}{2}} \cdot \sigma}{d}\right)^2, \text{ d = feilmargin.}$$

Testovervator for H$_0$: $\mu = \mu_0$

$$U_0 = \frac{\overline{X} - \mu_0}{\frac{\sigma}{\sqrt{n}}} \sim N\left(\frac{\mu - \mu_0}{\frac{\sigma}{\sqrt{n}}}, 1\right)$$

Hypotesetesting med ukjent σ

Antar normalfordelte observasjoner:

(1-α)·100 % Konfidensintervall for μ

$$\overline{X} \pm t_{\frac{\alpha}{2},n-1} \cdot \frac{S}{\sqrt{n}}$$

Testovervator for H$_0$: $\mu = \mu_0$

$$T_0 = \frac{\overline{X} - \mu_0}{\frac{S}{\sqrt{n}}}$$

Når H_0 er sann, er T_0 t-fordelt med (n-1) frihetsgrader.

Poissonfordelingen (normaltilnærming)

Tilnærmet (1-α)·100 % Konfidensintervall for λ

$$\hat{\lambda} \pm u_{\frac{\alpha}{2}} \cdot \sqrt{\hat{\lambda}}, \text{ der } \hat{\lambda} = X$$

Testovervator for H$_0$: $\lambda = \lambda_0$

$$U_0 = \frac{\hat{\lambda} - \lambda_0}{\sqrt{\lambda_0}}$$

Binomisk fordeling (normaltilnærming)

Tilnærmet (1-α)·100 % Konfidensintervall for p

$$\hat{p} \pm u_{\frac{\alpha}{2}} \cdot \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}, \text{ der } \hat{p} = \frac{X}{n}$$

Testovervator for H$_0$: $p = p_0$

$$U_0 = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

11 Korrelasjon

$$S_X^2 = \frac{1}{\text{n-1}}\sum_{i=1}^{n}(X_i - \overline{X})^2 = \left(\frac{1}{\text{n-1}}\sum_{i=1}^{n} X_i^2\right) - \overline{X}^2 \frac{\text{n}}{\text{n-1}}$$

$$S_Y^2 = \frac{1}{\text{n-1}}\sum_{i=1}^{n}(Y_i - \overline{Y})^2 = \left(\frac{1}{\text{n-1}}\sum_{i=1}^{n} Y_i^2\right) - \overline{Y}^2 \frac{\text{n}}{\text{n-1}}$$

$$S_{XY} = \frac{1}{\text{n-1}}\sum_{i=1}^{n}(X_i - \overline{X})(Y_i - \overline{Y}) = \left(\frac{1}{\text{n-1}}\sum_{i=1}^{n} X_i Y_i\right) - \overline{X} \cdot \overline{Y} \frac{\text{n}}{\text{n-1}}$$

Empirisk korrelasjonskoeffisient

$$R = \frac{S_{XY}}{S_X S_Y}$$

12 Regresjonsmodellen

Vi antar at vi har n par observasjoner av x og Y: $(x_1, Y_1), (x_2, Y_2), ..., (x_n, Y_n)$, der $Y_1, Y_2, ..., Y_n$ er uavhengige og normalfordelte stokastiske variable, og der $x_1, x_2, ..., x_n$ er kjente tall..

$$E(Y_i) = \beta_0 + \beta_1 x_i \quad \mathrm{Var}(Y_i) = \sigma^2 \quad i = 1, 2, ..., n$$

Minste kvadraters estimatorer

$$\hat{\beta}_1 = \frac{1}{M} \sum_{i=1}^{n} (x_i - \overline{x}) Y_i = \frac{1}{M} \left(\sum_{i=1}^{n} x_i Y_i - n\overline{x}\overline{Y} \right),$$

der $M = \sum_{i=1}^{n} (x_i - \overline{x})^2 = \left(\sum_{i=1}^{n} x_i^2 \right) - n\overline{x}^2$

$$\hat{\beta}_0 = \overline{Y} - \hat{\beta}_1 \overline{x}$$

$$\hat{\beta}_1 \sim N(\beta_1, \tfrac{\sigma^2}{M}) \qquad \hat{\beta}_0 \sim N(\beta_0, \tfrac{\sigma^2}{nM} \sum_{i=1}^{n} x_i^2)$$

Estimert regresjonslinje

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 x$$

(1-α)·100 % Konfidensintervall for β_1 (kjent σ)

$$\hat{\beta}_1 \pm u_{\frac{\alpha}{2}} \cdot \frac{\sigma}{\sqrt{M}}$$

Testovervator for H$_0$: $\beta_1 = \beta_1^0$ (kjent σ)

$$U_0 = \frac{\hat{\beta}_1 - \beta_1^0}{\frac{\sigma}{\sqrt{M}}} \sim N\left(\frac{\beta_1 - \beta_1^0}{\frac{\sigma}{\sqrt{M}}}, 1 \right)$$

Godhetsmål for regresjonsmodellen

$$R^2 = \left(\frac{S_{XY}}{S_X S_Y} \right)^2$$

Weibullplott

Anta $T \sim \mathcal{W}(\beta, \eta)$ og $F(t) = P(T \leq t)$

Vi har da følgende lineære sammenheng:

$y = \beta x + \mathrm{b}$

hvor

$$y = \ln \ln \frac{1}{1 - F(t)}$$

$$x = \ln(t)$$

$$b = -\beta \ln(\eta)$$

13 Gammafunksjonen: $\Gamma(z)$

$$\Gamma(z) = \int_0^\infty t^{(z-1)} e^{-t} dx \qquad z \in \mathbb{R}$$

$$\Gamma(z) = (z-1)! \qquad z \in \mathbb{N}$$

Noen verdier for $\Gamma(z)$:

z	0.00	0.01	0.02	0.03	0.04
1.0	1.0000	.99433	.98884	.98355	.97844
1.1	.95135	.94740	.94359	.93993	.93642
1.2	.91817	.91558	.91311	.91075	.90852
1.3	.89747	.89600	.89464	.89338	.89222
1.4	.88726	.88676	.88636	.88604	.88581
1.5	.88623	.88659	.88704	.88757	.88818
1.6	.89352	.89468	.89592	.89724	.89864
1.7	.90864	.91057	.91258	.91467	.91683
1.8	.93138	.93408	.93685	.93969	.94261
1.9	.96177	.96523	.96877	.97240	.97610
2.0	1.0000	1.0043	1.0086	1.0131	1.0176
2.1	1.0465	1.0516	1.0568	1.0621	1.0675
2.2	1.1018	1.1078	1.1140	1.1202	1.1266
2.3	1.1667	1.1738	1.1809	1.1882	1.1956
2.4	1.2422	1.2503	1.2586	1.2670	1.2756
2.5	1.3293	1.3388	1.3483	1.3580	1.3678
2.6	1.4296	1.4404	1.4514	1.4625	1.4738
2.7	1.5447	1.5571	1.5696	1.5824	1.5953
2.8	1.6765	1.6907	1.7051	1.7196	1.7344
2.9	1.8274	1.8436	1.8600	1.8767	1.8936
3.0	2.0000	2.0186	2.0374	2.0565	2.0759

z	0.05	0.06	0.07	0.08	0.09
1.0	.97350	.96874	.96415	.95973	.95546
1.1	.93304	.92980	.92670	.92373	.92089
1.2	.90640	.90440	.90250	.90072	.89904
1.3	.89115	.89018	.88931	.88854	.88785
1.4	.88566	.88560	.88563	.88575	.88595
1.5	.88887	.88964	.89049	.89142	.89243
1.6	.90012	.90167	.90330	.90500	.90678
1.7	.91906	.92137	.92376	.92623	.92877
1.8	.94561	.94869	.95184	.95507	.95838
1.9	.97988	.98374	.98768	.99171	.99581
2.0	1.0222	1.0269	1.0316	1.0365	1.0415
2.1	1.0730	1.0786	1.0842	1.0900	1.0959
2.2	1.1330	1.1395	1.1462	1.1529	1.1598
2.3	1.2031	1.2107	1.2184	1.2262	1.2341
2.4	1.2842	1.2930	1.3019	1.3109	1.3201
2.5	1.3777	1.3878	1.3981	1.4084	1.4190
2.6	1.4852	1.4968	1.5085	1.5204	1.5325
2.7	1.6084	1.6216	1.6351	1.6487	1.6625
2.8	1.7494	1.7646	1.7799	1.7955	1.8113
2.9	1.9108	1.9281	1.9457	1.9636	1.9817
3.0	2.0955	2.1153	2.1355	2.1559	2.1766

N(0, 1)-FORDELINGEN : $G(x) = P(X \leq x)$

Eksempel: $x = 2.04$ gir $P(X \leq 2.04) = G(2.04) = 0.9793$.

For negative verdier benyttes formelen: $G(-x) = 1 - G(x)$.

x	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998
3.5	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998
3.6	.9998	.9998	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999
3.7	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999
3.8	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999
3.9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Kvantiltabell:

α	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.002	0.001
u_α	0.842	1.282	1.645	1.960	2.054	2.326	2.576	2.878	3.090

KVANTILTABELL FOR t-FORDELINGEN

Tabellen gir $t_{\alpha,\, m}$ som er α-kvantilen i t-fordelingen med m frihetsgrader.

$$P(T > t_{\alpha,\, m}) = \alpha \quad \text{der} \quad T \sim t_m$$

Eksempel: $t_{0.10,\, 12} = 1.356$. Det betyr at $P(T > 1.356) = 0.10$ når $T \sim t_{12}$.

m \ α	0.20	0.10	0.05	0.025	0.02	0.01	0.005
1	1.376	3.078	6.314	12.706	15.894	31.821	63.656
2	1.061	1.886	2.920	4.303	4.849	6.965	9.925
3	0.978	1.638	2.353	3.182	3.482	4.541	5.841
4	0.941	1.533	2.132	2.776	2.999	3.747	4.604
5	0.920	1.476	2.015	2.571	2.757	3.365	4.032
6	0.906	1.440	1.943	2.447	2.612	3.143	3.707
7	0.896	1.415	1.895	2.365	2.517	2.998	3.499
8	0.889	1.397	1.860	2.306	2.449	2.896	3.355
9	0.883	1.383	1.833	2.262	2.398	2.821	3.250
10	0.879	1.372	1.812	2.228	2.359	2.764	3.169
11	0.876	1.363	1.796	2.201	2.328	2.718	3.106
12	0.873	1.356	1.782	2.179	2.303	2.681	3.055
13	0.870	1.350	1.771	2.160	2.282	2.650	3.012
14	0.868	1.345	1.761	2.145	2.264	2.624	2.977
15	0.866	1.341	1.753	2.131	2.249	2.602	2.947
16	0.865	1.337	1.746	2.120	2.235	2.583	2.921
17	0.863	1.333	1.740	2.110	2.224	2.567	2.898
18	0.862	1.330	1.734	2.101	2.214	2.552	2.878
19	0.861	1.328	1.729	2.093	2.205	2.539	2.861
20	0.860	1.325	1.725	2.086	2.197	2.528	2.845
21	0.859	1.323	1.721	2.080	2.189	2.518	2.831
22	0.858	1.321	1.717	2.074	2.183	2.508	2.819
23	0.858	1.319	1.714	2.069	2.177	2.500	2.807
24	0.857	1.318	1.711	2.064	2.172	2.492	2.797
25	0.856	1.316	1.708	2.060	2.167	2.485	2.787
26	0.856	1.315	1.706	2.056	2.162	2.479	2.779
27	0.855	1.314	1.703	2.052	2.158	2.473	2.771
28	0.855	1.313	1.701	2.048	2.154	2.467	2.763
29	0.854	1.311	1.699	2.045	2.150	2.462	2.756
30	0.854	1.310	1.697	2.042	2.147	2.457	2.750
31	0.853	1.309	1.696	2.040	2.144	2.453	2.744
32	0.853	1.309	1.694	2.037	2.141	2.449	2.738
33	0.853	1.308	1.692	2.035	2.138	2.445	2.733
34	0.852	1.307	1.691	2.032	2.136	2.441	2.728
35	0.852	1.306	1.690	2.030	2.133	2.438	2.724
36	0.852	1.306	1.688	2.028	2.131	2.434	2.719
37	0.851	1.305	1.687	2.026	2.129	2.431	2.715
38	0.851	1.304	1.686	2.024	2.127	2.429	2.712
39	0.851	1.304	1.685	2.023	2.125	2.426	2.708
40	0.851	1.303	1.684	2.021	2.123	2.423	2.704
50	0.849	1.299	1.676	2.009	2.109	2.403	2.678
60	0.848	1.296	1.671	2.000	2.099	2.390	2.660
70	0.847	1.294	1.667	1.994	2.093	2.381	2.648
80	0.846	1.292	1.664	1.990	2.088	2.374	2.639
∞	0.842	1.282	1.645	1.960	2.054	2.326	2.576

BINOMISK FORDELING : P(X ≤ x)

Linjer der alle sannsynlighetene er lik 1.000 er ikke tatt med i tabellen.

n	x \ p	0.05	0.10	0.15	0.20	0.25	0.30	0.40	0.50
2									
	0	0.903	0.810	0.723	0.640	0.563	0.490	0.360	0.250
	1	0.998	0.990	0.978	0.960	0.938	0.910	0.840	0.750
3									
	0	0.857	0.729	0.614	0.512	0.422	0.343	0.216	0.125
	1	0.993	0.972	0.939	0.896	0.844	0.784	0.648	0.500
	2	1.000	0.999	0.997	0.992	0.984	0.973	0.936	0.875
4									
	0	0.815	0.656	0.522	0.410	0.316	0.240	0.130	0.063
	1	0.986	0.948	0.890	0.819	0.738	0.652	0.475	0.313
	2	1.000	0.996	0.988	0.973	0.949	0.916	0.821	0.688
	3	1.000	1.000	0.999	0.998	0.996	0.992	0.974	0.938
5									
	0	0.774	0.590	0.444	0.328	0.237	0.168	0.078	0.031
	1	0.977	0.919	0.835	0.737	0.633	0.528	0.337	0.188
	2	0.999	0.991	0.973	0.942	0.896	0.837	0.683	0.500
	3	1.000	1.000	0.998	0.993	0.984	0.969	0.913	0.813
	4	1.000	1.000	1.000	1.000	0.999	0.998	0.990	0.969
6									
	0	0.735	0.531	0.377	0.262	0.178	0.118	0.047	0.016
	1	0.967	0.886	0.776	0.655	0.534	0.420	0.233	0.109
	2	0.998	0.984	0.953	0.901	0.831	0.744	0.544	0.344
	3	1.000	0.999	0.994	0.983	0.962	0.930	0.821	0.656
	4	1.000	1.000	1.000	0.998	0.995	0.989	0.959	0.891
	5	1.000	1.000	1.000	1.000	1.000	0.999	0.996	0.984
7									
	0	0.698	0.478	0.321	0.210	0.133	0.082	0.028	0.008
	1	0.956	0.850	0.717	0.577	0.445	0.329	0.159	0.063
	2	0.996	0.974	0.926	0.852	0.756	0.647	0.420	0.227
	3	1.000	0.997	0.988	0.967	0.929	0.874	0.710	0.500
	4	1.000	1.000	0.999	0.995	0.987	0.971	0.904	0.773
	5	1.000	1.000	1.000	1.000	0.999	0.996	0.981	0.938
	6	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.992
8									
	0	0.663	0.430	0.272	0.168	0.100	0.058	0.017	0.004
	1	0.943	0.813	0.657	0.503	0.367	0.255	0.106	0.035
	2	0.994	0.962	0.895	0.797	0.679	0.552	0.315	0.145
	3	1.000	0.995	0.979	0.944	0.886	0.806	0.594	0.363
	4	1.000	1.000	0.997	0.990	0.973	0.942	0.826	0.637
	5	1.000	1.000	1.000	0.999	0.996	0.989	0.950	0.855
	6	1.000	1.000	1.000	1.000	1.000	0.999	0.991	0.965
	7	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.996

BINOMISK FORDELING : $P(X \leq x)$

Linjer der alle sannsynlighetene er lik 1.000 er ikke tatt med i tabellen.

n	x \ p	0.05	0.10	0.15	0.20	0.25	0.30	0.40	0.50
9									
	0	0.630	0.387	0.232	0.134	0.075	0.040	0.010	0.002
	1	0.929	0.775	0.599	0.436	0.300	0.196	0.071	0.020
	2	0.992	0.947	0.859	0.738	0.601	0.463	0.232	0.090
	3	0.999	0.992	0.966	0.914	0.834	0.730	0.483	0.254
	4	1.000	0.999	0.994	0.980	0.951	0.901	0.733	0.500
	5	1.000	1.000	0.999	0.997	0.990	0.975	0.901	0.746
	6	1.000	1.000	1.000	1.000	0.999	0.996	0.975	0.910
	7	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.980
	8	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998
10									
	0	0.599	0.349	0.197	0.107	0.056	0.028	0.006	0.001
	1	0.914	0.736	0.544	0.376	0.244	0.149	0.046	0.011
	2	0.988	0.930	0.820	0.678	0.526	0.383	0.167	0.055
	3	0.999	0.987	0.950	0.879	0.776	0.650	0.382	0.172
	4	1.000	0.998	0.990	0.967	0.922	0.850	0.633	0.377
	5	1.000	1.000	0.999	0.994	0.980	0.953	0.834	0.623
	6	1.000	1.000	1.000	0.999	0.996	0.989	0.945	0.828
	7	1.000	1.000	1.000	1.000	1.000	0.998	0.988	0.945
	8	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.989
	9	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999
11									
	0	0.569	0.314	0.167	0.086	0.042	0.020	0.004	0.000
	1	0.898	0.697	0.492	0.322	0.197	0.113	0.030	0.006
	2	0.985	0.910	0.779	0.617	0.455	0.313	0.119	0.033
	3	0.998	0.981	0.931	0.839	0.713	0.570	0.296	0.113
	4	1.000	0.997	0.984	0.950	0.885	0.790	0.533	0.274
	5	1.000	1.000	0.997	0.988	0.966	0.922	0.753	0.500
	6	1.000	1.000	1.000	0.998	0.992	0.978	0.901	0.726
	7	1.000	1.000	1.000	1.000	0.999	0.996	0.971	0.887
	8	1.000	1.000	1.000	1.000	1.000	0.999	0.994	0.967
	9	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.994
12									
	0	0.540	0.282	0.142	0.069	0.032	0.014	0.002	0.000
	1	0.882	0.659	0.443	0.275	0.158	0.085	0.020	0.003
	2	0.980	0.889	0.736	0.558	0.391	0.253	0.083	0.019
	3	0.998	0.974	0.908	0.795	0.649	0.493	0.225	0.073
	4	1.000	0.996	0.976	0.927	0.842	0.724	0.438	0.194
	5	1.000	0.999	0.995	0.981	0.946	0.882	0.665	0.387
	6	1.000	1.000	0.999	0.996	0.986	0.961	0.842	0.613
	7	1.000	1.000	1.000	0.999	0.997	0.991	0.943	0.806
	8	1.000	1.000	1.000	1.000	1.000	0.998	0.985	0.927
	9	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.981
	10	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997

BINOMISK FORDELING : $P(X \leq x)$

Linjer der alle sannsynlighetene er lik 1.000 er ikke tatt med i tabellen.

n	x \ p	0.05	0.10	0.15	0.20	0.25	0.30	0.40	0.50
13									
	0	0.513	0.254	0.121	0.055	0.024	0.010	0.001	0.000
	1	0.865	0.621	0.398	0.234	0.127	0.064	0.013	0.002
	2	0.975	0.866	0.692	0.502	0.333	0.202	0.058	0.011
	3	0.997	0.966	0.882	0.747	0.584	0.421	0.169	0.046
	4	1.000	0.994	0.966	0.901	0.794	0.654	0.353	0.133
	5	1.000	0.999	0.992	0.970	0.920	0.835	0.574	0.291
	6	1.000	1.000	0.999	0.993	0.976	0.938	0.771	0.500
	7	1.000	1.000	1.000	0.999	0.994	0.982	0.902	0.709
	8	1.000	1.000	1.000	1.000	0.999	0.996	0.968	0.867
	9	1.000	1.000	1.000	1.000	1.000	0.999	0.992	0.954
	10	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.989
	11	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998
14									
	0	0.488	0.229	0.103	0.044	0.018	0.007	0.001	0.000
	1	0.847	0.585	0.357	0.198	0.101	0.047	0.008	0.001
	2	0.970	0.842	0.648	0.448	0.281	0.161	0.040	0.006
	3	0.996	0.956	0.853	0.698	0.521	0.355	0.124	0.029
	4	1.000	0.991	0.953	0.870	0.742	0.584	0.279	0.090
	5	1.000	0.999	0.988	0.956	0.888	0.781	0.486	0.212
	6	1.000	1.000	0.998	0.988	0.962	0.907	0.692	0.395
	7	1.000	1.000	1.000	0.998	0.990	0.969	0.850	0.605
	8	1.000	1.000	1.000	1.000	0.998	0.992	0.942	0.788
	9	1.000	1.000	1.000	1.000	1.000	0.998	0.982	0.910
	10	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.971
	11	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.994
	12	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999
15									
	0	0.463	0.206	0.087	0.035	0.013	0.005	0.000	0.000
	1	0.829	0.549	0.319	0.167	0.080	0.035	0.005	0.000
	2	0.964	0.816	0.604	0.398	0.236	0.127	0.027	0.004
	3	0.995	0.944	0.823	0.648	0.461	0.297	0.091	0.018
	4	0.999	0.987	0.938	0.836	0.686	0.515	0.217	0.059
	5	1.000	0.998	0.983	0.939	0.852	0.722	0.403	0.151
	6	1.000	1.000	0.996	0.982	0.943	0.869	0.610	0.304
	7	1.000	1.000	0.999	0.996	0.983	0.950	0.787	0.500
	8	1.000	1.000	1.000	0.999	0.996	0.985	0.905	0.696
	9	1.000	1.000	1.000	1.000	0.999	0.996	0.966	0.849
	10	1.000	1.000	1.000	1.000	1.000	0.999	0.991	0.941
	11	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.982
	12	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996

BINOMISK FORDELING : $P(X \leq x)$

Linjer der alle sannsynlighetene er lik 1.000 er ikke tatt med i tabellen.

n	x \ p	0.05	0.10	0.15	0.20	0.25	0.30	0.40	0.50
16									
	0	0.440	0.185	0.074	0.028	0.010	0.003	0.000	0.000
	1	0.811	0.515	0.284	0.141	0.063	0.026	0.003	0.000
	2	0.957	0.789	0.561	0.352	0.197	0.099	0.018	0.002
	3	0.993	0.932	0.790	0.598	0.405	0.246	0.065	0.011
	4	0.999	0.983	0.921	0.798	0.630	0.450	0.167	0.038
	5	1.000	0.997	0.976	0.918	0.810	0.660	0.329	0.105
	6	1.000	0.999	0.994	0.973	0.920	0.825	0.527	0.227
	7	1.000	1.000	0.999	0.993	0.973	0.926	0.716	0.402
	8	1.000	1.000	1.000	0.999	0.993	0.974	0.858	0.598
	9	1.000	1.000	1.000	1.000	0.998	0.993	0.942	0.773
	10	1.000	1.000	1.000	1.000	1.000	0.998	0.981	0.895
	11	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.962
	12	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.989
	13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998
17									
	0	0.418	0.167	0.063	0.023	0.008	0.002	0.000	0.000
	1	0.792	0.482	0.252	0.118	0.050	0.019	0.002	0.000
	2	0.950	0.762	0.520	0.310	0.164	0.077	0.012	0.001
	3	0.991	0.917	0.756	0.549	0.353	0.202	0.046	0.006
	4	0.999	0.978	0.901	0.758	0.574	0.389	0.126	0.025
	5	1.000	0.995	0.968	0.894	0.765	0.597	0.264	0.072
	6	1.000	0.999	0.992	0.962	0.893	0.775	0.448	0.166
	7	1.000	1.000	0.998	0.989	0.960	0.895	0.641	0.315
	8	1.000	1.000	1.000	0.997	0.988	0.960	0.801	0.500
	9	1.000	1.000	1.000	1.000	0.997	0.987	0.908	0.685
	10	1.000	1.000	1.000	1.000	0.999	0.997	0.965	0.834
	11	1.000	1.000	1.000	1.000	1.000	0.999	0.989	0.928
	12	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.975
	13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.994
	14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999
18									
	0	0.397	0.150	0.054	0.018	0.006	0.002	0.000	0.000
	1	0.774	0.450	0.224	0.099	0.039	0.014	0.001	0.000
	2	0.942	0.734	0.480	0.271	0.135	0.060	0.008	0.001
	3	0.989	0.902	0.720	0.501	0.306	0.165	0.033	0.004
	4	0.998	0.972	0.879	0.716	0.519	0.333	0.094	0.015
	5	1.000	0.994	0.958	0.867	0.717	0.534	0.209	0.048
	6	1.000	0.999	0.988	0.949	0.861	0.722	0.374	0.119
	7	1.000	1.000	0.997	0.984	0.943	0.859	0.563	0.240
	8	1.000	1.000	0.999	0.996	0.981	0.940	0.737	0.407
	9	1.000	1.000	1.000	0.999	0.995	0.979	0.865	0.593
	10	1.000	1.000	1.000	1.000	0.999	0.994	0.942	0.760
	11	1.000	1.000	1.000	1.000	1.000	0.999	0.980	0.881

BINOMISK FORDELING : $P(X \leq x)$

Linjer der alle sannsynlighetene er lik 1.000 er ikke tatt med i tabellen.

n	x \ p	0.05	0.10	0.15	0.20	0.25	0.30	0.40	0.50
18									
	12	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.952
	13	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.985
	14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999
19									
	0	0.377	0.135	0.046	0.014	0.004	0.001	0.000	0.000
	1	0.755	0.420	0.198	0.083	0.031	0.010	0.001	0.000
	2	0.933	0.705	0.441	0.237	0.111	0.046	0.005	0.000
	3	0.987	0.885	0.684	0.455	0.263	0.133	0.023	0.002
	4	0.998	0.965	0.856	0.673	0.465	0.282	0.070	0.010
	5	1.000	0.991	0.946	0.837	0.668	0.474	0.163	0.032
	6	1.000	0.998	0.984	0.932	0.825	0.666	0.308	0.084
	7	1.000	1.000	0.996	0.977	0.923	0.818	0.488	0.180
	8	1.000	1.000	0.999	0.993	0.971	0.916	0.667	0.324
	9	1.000	1.000	1.000	0.998	0.991	0.967	0.814	0.500
	10	1.000	1.000	1.000	1.000	0.998	0.989	0.912	0.676
	11	1.000	1.000	1.000	1.000	1.000	0.997	0.965	0.820
	12	1.000	1.000	1.000	1.000	1.000	0.999	0.988	0.916
	13	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.968
	14	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.990
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998
20									
	0	0.358	0.122	0.039	0.012	0.003	0.001	0.000	0.000
	1	0.736	0.392	0.176	0.069	0.024	0.008	0.001	0.000
	2	0.925	0.677	0.405	0.206	0.091	0.035	0.004	0.000
	3	0.984	0.867	0.648	0.411	0.225	0.107	0.016	0.001
	4	0.997	0.957	0.830	0.630	0.415	0.238	0.051	0.006
	5	1.000	0.989	0.933	0.804	0.617	0.416	0.126	0.021
	6	1.000	0.998	0.978	0.913	0.786	0.608	0.250	0.058
	7	1.000	1.000	0.994	0.968	0.898	0.772	0.416	0.132
	8	1.000	1.000	0.999	0.990	0.959	0.887	0.596	0.252
	9	1.000	1.000	1.000	0.997	0.986	0.952	0.755	0.412
	10	1.000	1.000	1.000	0.999	0.996	0.983	0.872	0.588
	11	1.000	1.000	1.000	1.000	0.999	0.995	0.943	0.748
	12	1.000	1.000	1.000	1.000	1.000	0.999	0.979	0.868
	13	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.942
	14	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.979
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.994
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999

POISSON FORDELING : $P(X \le x)$

x \ λ	0.1	0.5	1.0	1.5	2.0	2.5	3.0
0	0.9048	0.6065	0.3679	0.2231	0.1353	0.0821	0.0498
1	0.9953	0.9098	0.7358	0.5578	0.4060	0.2873	0.1991
2	0.9998	0.9856	0.9197	0.8088	0.6767	0.5438	0.4232
3	1.0000	0.9982	0.9810	0.9344	0.8571	0.7576	0.6472
4	1.0000	0.9998	0.9963	0.9814	0.9473	0.8912	0.8153
5	1.0000	1.0000	0.9994	0.9955	0.9834	0.9580	0.9161
6	1.0000	1.0000	0.9999	0.9991	0.9955	0.9858	0.9665
7	1.0000	1.0000	1.0000	0.9998	0.9989	0.9958	0.9881
8	1.0000	1.0000	1.0000	1.0000	0.9998	0.9989	0.9962
9	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9989
10	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997
11	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

x \ λ	3.5	4.0	4.5	5.0	5.5	6.0	6.5
0	0.0302	0.0183	0.0111	0.0067	0.0041	0.0025	0.0015
1	0.1359	0.0916	0.0611	0.0404	0.0266	0.0174	0.0113
2	0.3208	0.2381	0.1736	0.1247	0.0884	0.0620	0.0430
3	0.5366	0.4335	0.3423	0.2650	0.2017	0.1512	0.1118
4	0.7254	0.6288	0.5321	0.4405	0.3575	0.2851	0.2237
5	0.8576	0.7851	0.7029	0.6160	0.5289	0.4457	0.3690
6	0.9347	0.8893	0.8311	0.7622	0.6860	0.6063	0.5265
7	0.9733	0.9489	0.9134	0.8666	0.8095	0.7440	0.6728
8	0.9901	0.9786	0.9597	0.9319	0.8944	0.8472	0.7916
9	0.9967	0.9919	0.9829	0.9682	0.9462	0.9161	0.8774
10	0.9990	0.9972	0.9933	0.9863	0.9747	0.9574	0.9332
11	0.9997	0.9991	0.9976	0.9945	0.9890	0.9799	0.9661
12	0.9999	0.9997	0.9992	0.9980	0.9955	0.9912	0.9840
13	1.0000	0.9999	0.9997	0.9993	0.9983	0.9964	0.9929
14	1.0000	1.0000	0.9999	0.9998	0.9994	0.9986	0.9970
15	1.0000	1.0000	1.0000	0.9999	0.9998	0.9995	0.9988
16	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9996
17	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998
18	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
19	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

x \ λ	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0	0.0009	0.0006	0.0003	0.0002	0.0001	0.0001	0.0000
1	0.0073	0.0047	0.0030	0.0019	0.0012	0.0008	0.0005
2	0.0296	0.0203	0.0138	0.0093	0.0062	0.0042	0.0028
3	0.0818	0.0591	0.0424	0.0301	0.0212	0.0149	0.0103
4	0.1730	0.1321	0.0996	0.0744	0.0550	0.0403	0.0293
5	0.3007	0.2414	0.1912	0.1496	0.1157	0.0885	0.0671
6	0.4497	0.3782	0.3134	0.2562	0.2068	0.1649	0.1301
7	0.5987	0.5246	0.4530	0.3856	0.3239	0.2687	0.2202
8	0.7291	0.6620	0.5925	0.5231	0.4557	0.3918	0.3328
9	0.8305	0.7764	0.7166	0.6530	0.5874	0.5218	0.4579
10	0.9015	0.8622	0.8159	0.7634	0.7060	0.6453	0.5830
11	0.9467	0.9208	0.8881	0.8487	0.8030	0.7520	0.6968
12	0.9730	0.9573	0.9362	0.9091	0.8758	0.8364	0.7916

POISSON FORDELING : P(X ≤ x)

x \ λ	7.0	7.5	8.0	8.5	9.0	9.5	10.0
13	0.9872	0.9784	0.9658	0.9486	0.9261	0.8981	0.8645
14	0.9943	0.9897	0.9827	0.9726	0.9585	0.9400	0.9165
15	0.9976	0.9954	0.9918	0.9862	0.9780	0.9665	0.9513
16	0.9990	0.9980	0.9963	0.9934	0.9889	0.9823	0.9730
17	0.9996	0.9992	0.9984	0.9970	0.9947	0.9911	0.9857
18	0.9999	0.9997	0.9993	0.9987	0.9976	0.9957	0.9928
19	1.0000	0.9999	0.9997	0.9995	0.9989	0.9980	0.9965
20	1.0000	1.0000	0.9999	0.9998	0.9996	0.9991	0.9984
21	1.0000	1.0000	1.0000	0.9999	0.9998	0.9996	0.9993
22	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9997
23	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999
24	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

x \ λ	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0012	0.0005	0.0002	0.0001	0.0000	0.0000	0.0000
3	0.0049	0.0023	0.0011	0.0005	0.0002	0.0001	0.0000
4	0.0151	0.0076	0.0037	0.0018	0.0009	0.0004	0.0002
5	0.0375	0.0203	0.0107	0.0055	0.0028	0.0014	0.0007
6	0.0786	0.0458	0.0259	0.0142	0.0076	0.0040	0.0021
7	0.1432	0.0895	0.0540	0.0316	0.0180	0.0100	0.0054
8	0.2320	0.1550	0.0998	0.0621	0.0374	0.0220	0.0126
9	0.3405	0.2424	0.1658	0.1094	0.0699	0.0433	0.0261
10	0.4599	0.3472	0.2517	0.1757	0.1185	0.0774	0.0491
11	0.5793	0.4616	0.3532	0.2600	0.1848	0.1270	0.0847
12	0.6887	0.5760	0.4631	0.3585	0.2676	0.1931	0.1350
13	0.7813	0.6815	0.5730	0.4644	0.3632	0.2745	0.2009
14	0.8540	0.7720	0.6751	0.5704	0.4657	0.3675	0.2808
15	0.9074	0.8444	0.7636	0.6694	0.5681	0.4667	0.3715
16	0.9441	0.8987	0.8355	0.7559	0.6641	0.5660	0.4677
17	0.9678	0.9370	0.8905	0.8272	0.7489	0.6593	0.5640
18	0.9823	0.9626	0.9302	0.8826	0.8195	0.7423	0.6550
19	0.9907	0.9787	0.9573	0.9235	0.8752	0.8122	0.7363
20	0.9953	0.9884	0.9750	0.9521	0.9170	0.8682	0.8055
21	0.9977	0.9939	0.9859	0.9712	0.9469	0.9108	0.8615
22	0.9990	0.9970	0.9924	0.9833	0.9673	0.9418	0.9047
23	0.9995	0.9985	0.9960	0.9907	0.9805	0.9633	0.9367
24	0.9998	0.9993	0.9980	0.9950	0.9888	0.9777	0.9594
25	0.9999	0.9997	0.9990	0.9974	0.9938	0.9869	0.9748
26	1.0000	0.9999	0.9995	0.9987	0.9967	0.9925	0.9848
27	1.0000	0.9999	0.9998	0.9994	0.9983	0.9959	0.9912
28	1.0000	1.0000	0.9999	0.9997	0.9991	0.9978	0.9950
29	1.0000	1.0000	1.0000	0.9999	0.9996	0.9989	0.9973
30	1.0000	1.0000	1.0000	0.9999	0.9998	0.9994	0.9986
31	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9993
32	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9996
33	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998
34	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
35	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000