

# Kontrolle von Binomialverteilungen

Dokumentnummer: DX1019  
 Fachgebiet: Wahrscheinlichkeitsrechnung

## 1 Aufgabe 1



Figure 1:

n = 10		p = 0.1	
k	P(X=k)	P(0<=X<=k)	
0	0,34867844	0,34867844	
1	0,38742049	0,73609893	
2	0,19371024	0,92980917	
3	0,05739563	0,98720480	
4	0,01116026	0,99836506	
5	0,00148803	0,99985310	
6	0,00013778	0,99999088	
7	0,00000875	0,99999963	
8	0,00000036	0,99999999	
9	0,00000001	1,00000000	
P(0<=k<=10) =		1,00000000	

```
(%i1) kill(all);
```

```
(%o0) done
```

```
(%i1) n:10;p:0.1;
```

```
(%o1) 10
```

```
(%o2) 0.1
```

```
(%i3) W(k):=binomial(n,k)*p**k*(1-p)**(n-k);
```

```
(%o3)  $W(k) := \binom{n}{k} p^k (1-p)^{n-k}$ 
```

```
(%i4) K:makelist(k,k,0,10);
```

```
(%o4) [0,1,2,3,4,5,6,7,8,9,10]
```

```
(%i5) P:makelist(W(k),k,0,10);
```

```
(%o5) [0.3486784401, 0.387420489, 0.1937102445, 0.057395628, 0.011160261,
0.0014880348, 1.3778100000000001 10-4, 8.7480000000000067 10-6,
3.6450000000000033 10-7, 9.0000000000000078 10-9, 1.0000000000000011 10-10]
```

```
(%i6) S:makelist(sum(W(i),i,0,k),k,0,10);
```

```
(%o6) [0.3486784401, 0.7360989291, 0.9298091736, 0.9872048016,
0.9983650626, 0.9998530974, 0.9999908784, 0.9999996264, 0.9999999909,
0.9999999999, 1.0]
```

## 2 Aufgabe 2

Figure 2:

n = 10		p = 0.5	
k	P(X=k)	P(0<=X<=k)	
0	0,00097656	0,00097656	
1	0,00976563	0,01074219	
2	0,04394531	0,05468750	
3	0,11718750	0,17187500	
4	0,20507813	0,37695313	
5	0,24609375	0,62304688	
6	0,20507813	0,82812500	
7	0,11718750	0,94531250	
8	0,04394531	0,98925781	
9	0,00976563	0,99902344	
10	0,00097656	1,00000000	
P(0<=k<=10) =		1,00000000	

### 3 Aufgabe 3

Figure 3:

n = 6		p = 0.5	
k	P(X=k)	P(0<=X<=k)	
0	0,01562500	0,01562500	
1	0,09375000	0,10937500	
2	0,23437500	0,34375000	
3	0,31250000	0,65625000	
4	0,23437500	0,89062500	
5	0,09375000	0,98437500	
6	0,01562500	1,00000000	
P(0<=k<=6) =		1,00000000	

### 4 Aufgabe 4

Figure 4:

n = 6		p = 0.2	
k	P(X=k)	P(0<=X<=k)	
0	0,26214400	0,26214400	
1	0,39321600	0,65536000	
2	0,24576000	0,90112000	
3	0,08192000	0,98304000	
4	0,01536000	0,99840000	
5	0,00153600	0,99993600	
6	0,00006400	1,00000000	
P(0<=k<=6) =		1,00000000	