

Mathematische Statistik

Binomialverteilung

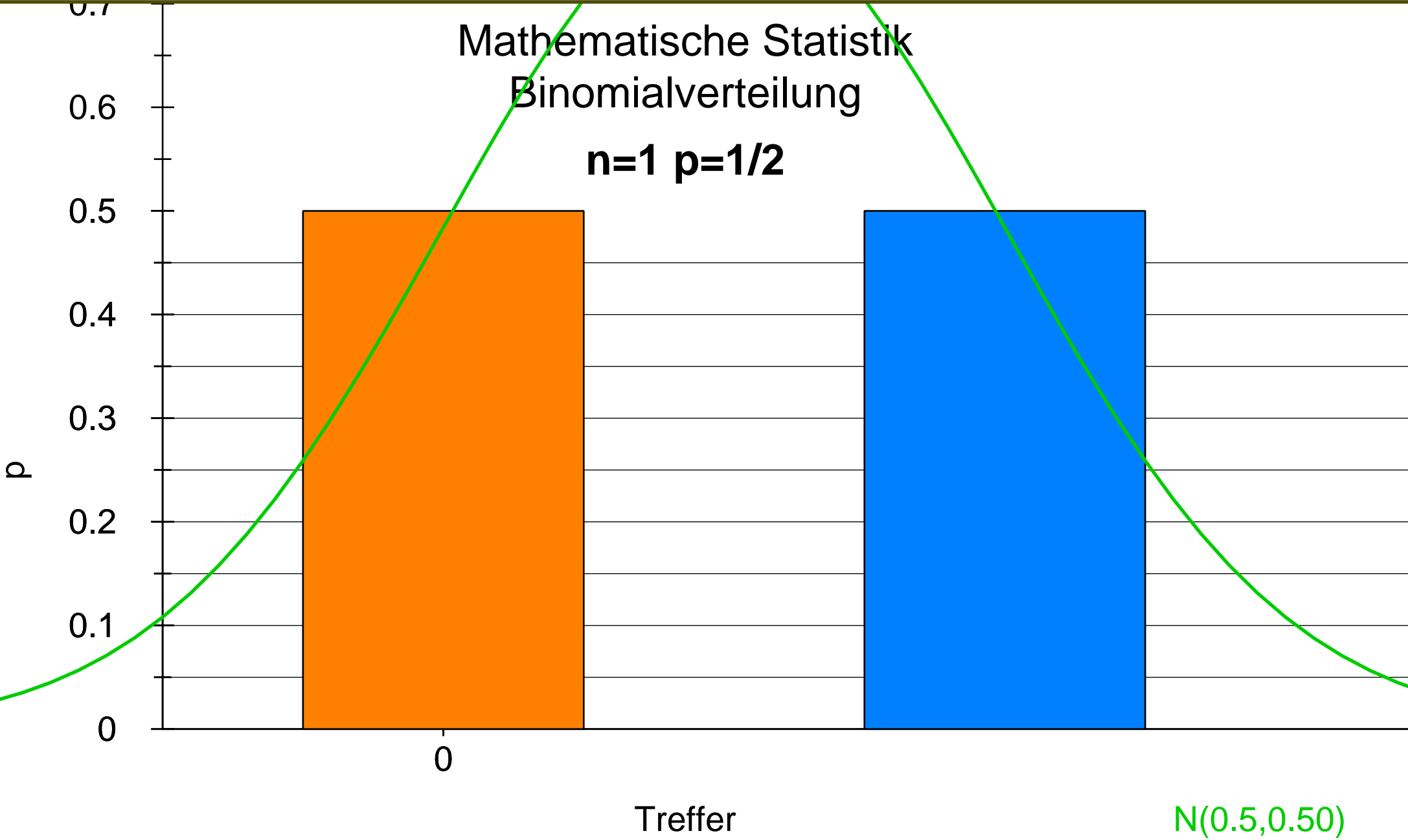
G. Wegener

Hannover, im Oktober 2017,
alle Rechte vorbehalten.

Mathematische Statistik

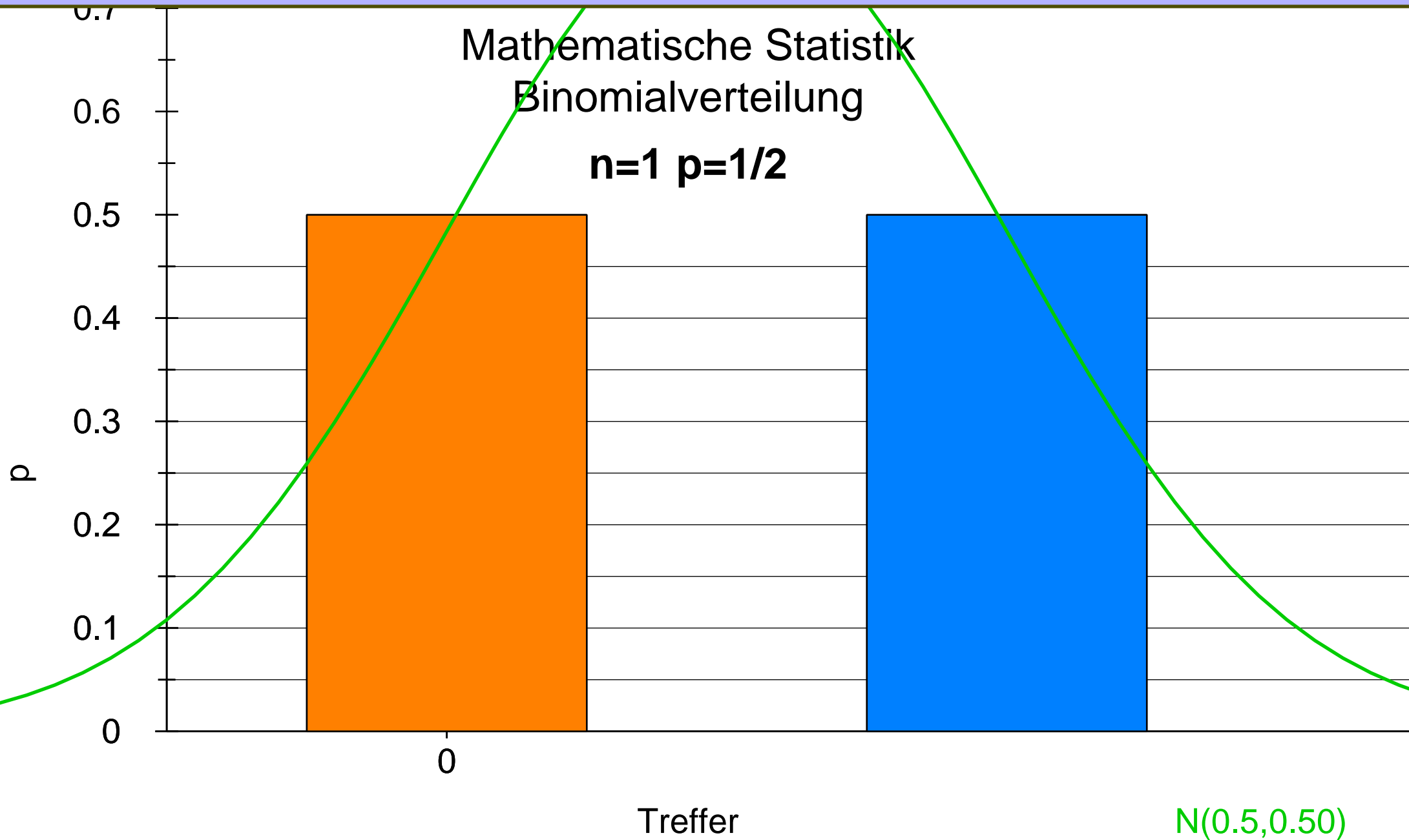
Binomialverteilung

n=1 p=1/2



Mathematische Statistik
Binomialverteilung

$n=1$ $p=1/2$

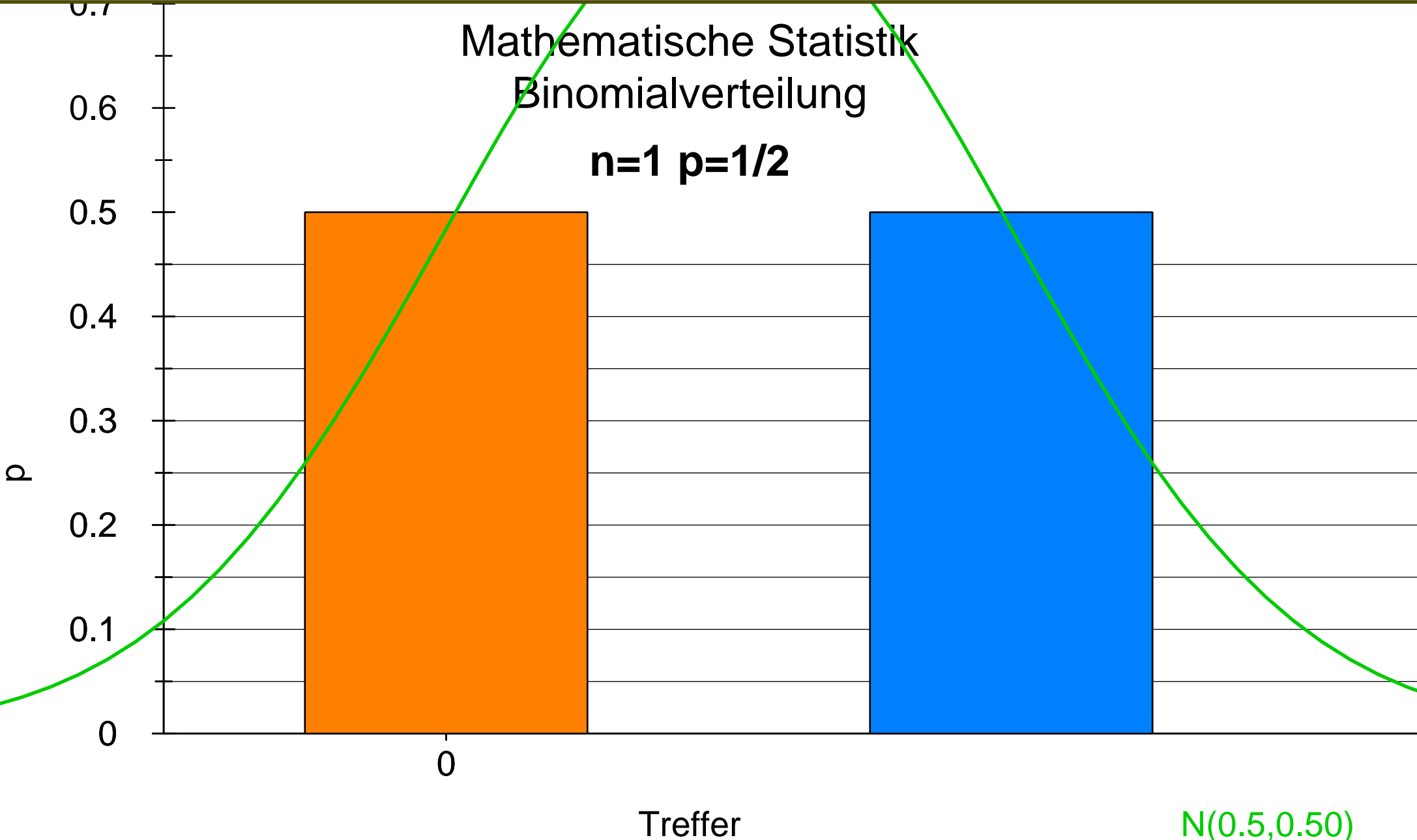


$N(0.5, 0.50)$

Mathematische Statistik

Binomialverteilung

n=1 p=1/2



Mathematische Statistik
Binomialverteilung

n=1 p=1/2

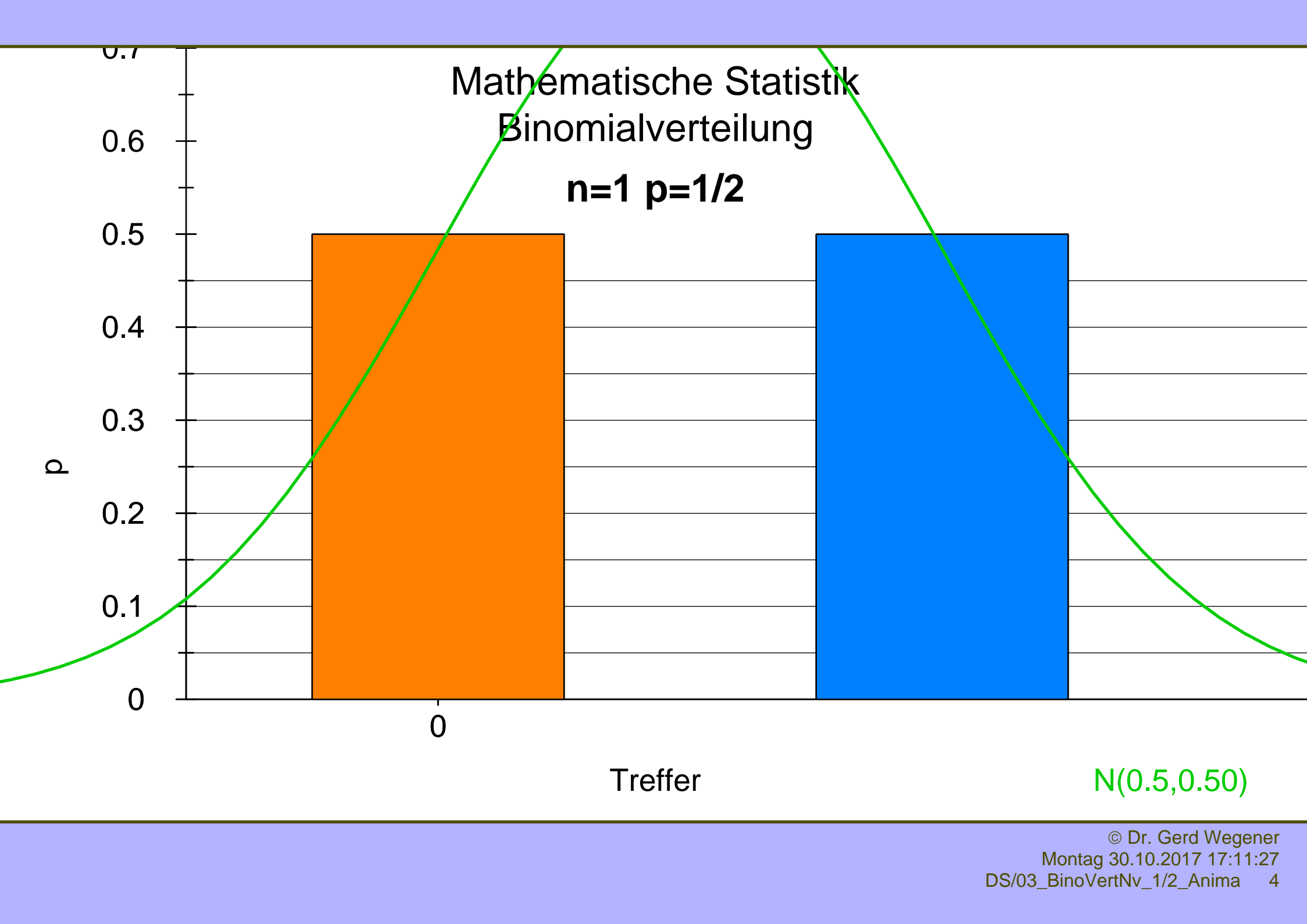
p

0.7
0.6
0.5
0.4
0.3
0.2
0.1
0

0

Treffer

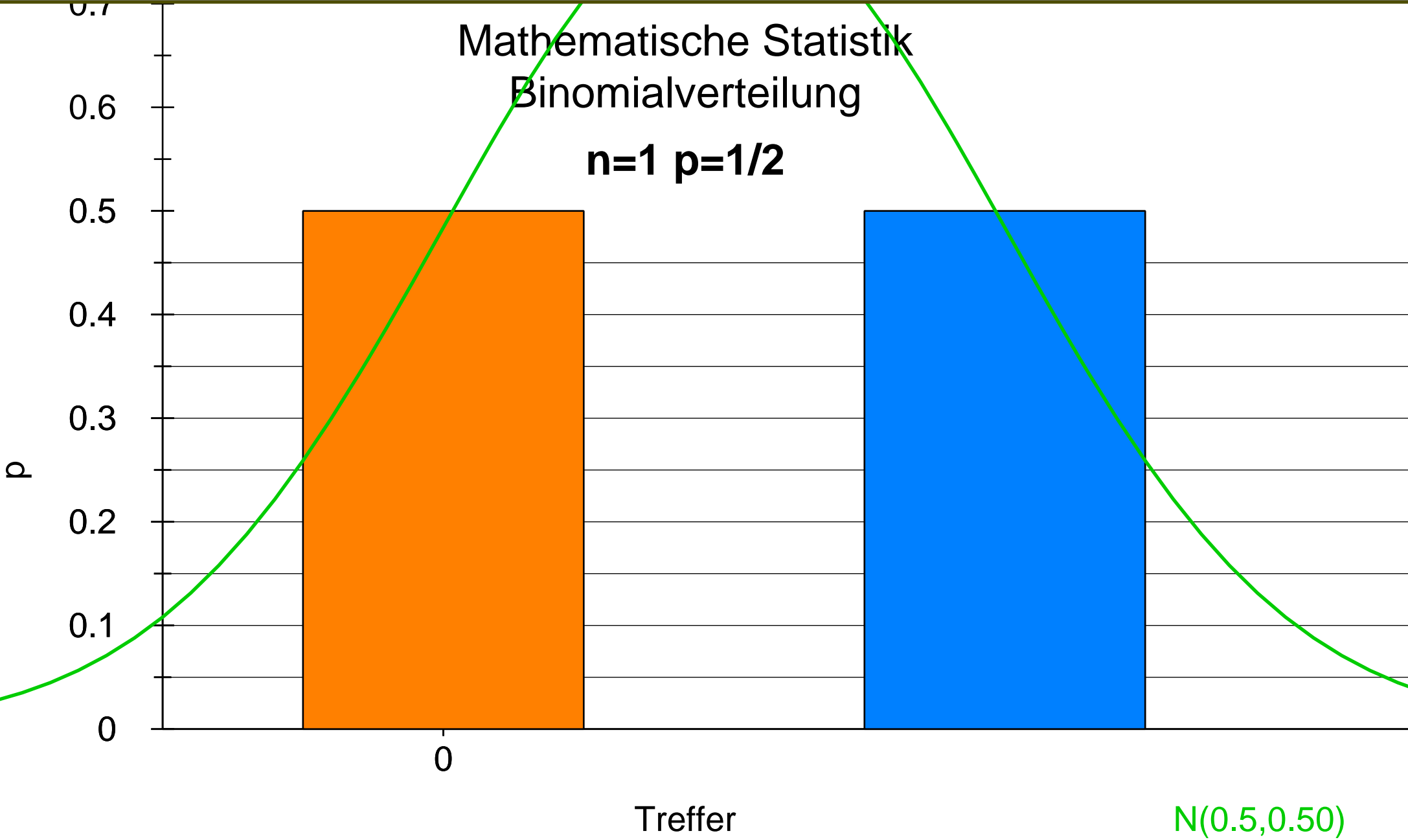
$N(0.5,0.50)$



Mathematische Statistik

Binomialverteilung

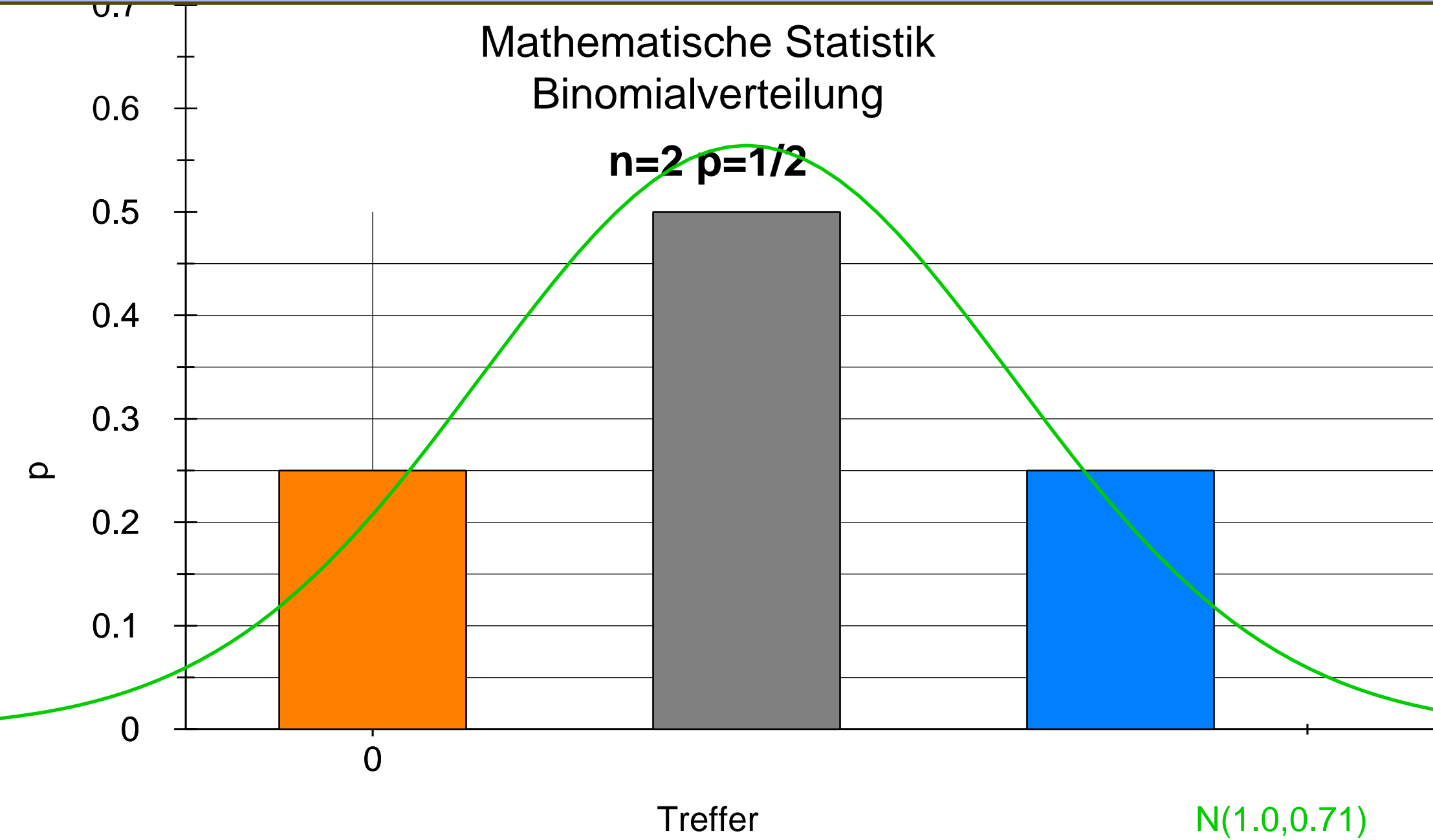
n=1 p=1/2



Mathematische Statistik

Binomialverteilung

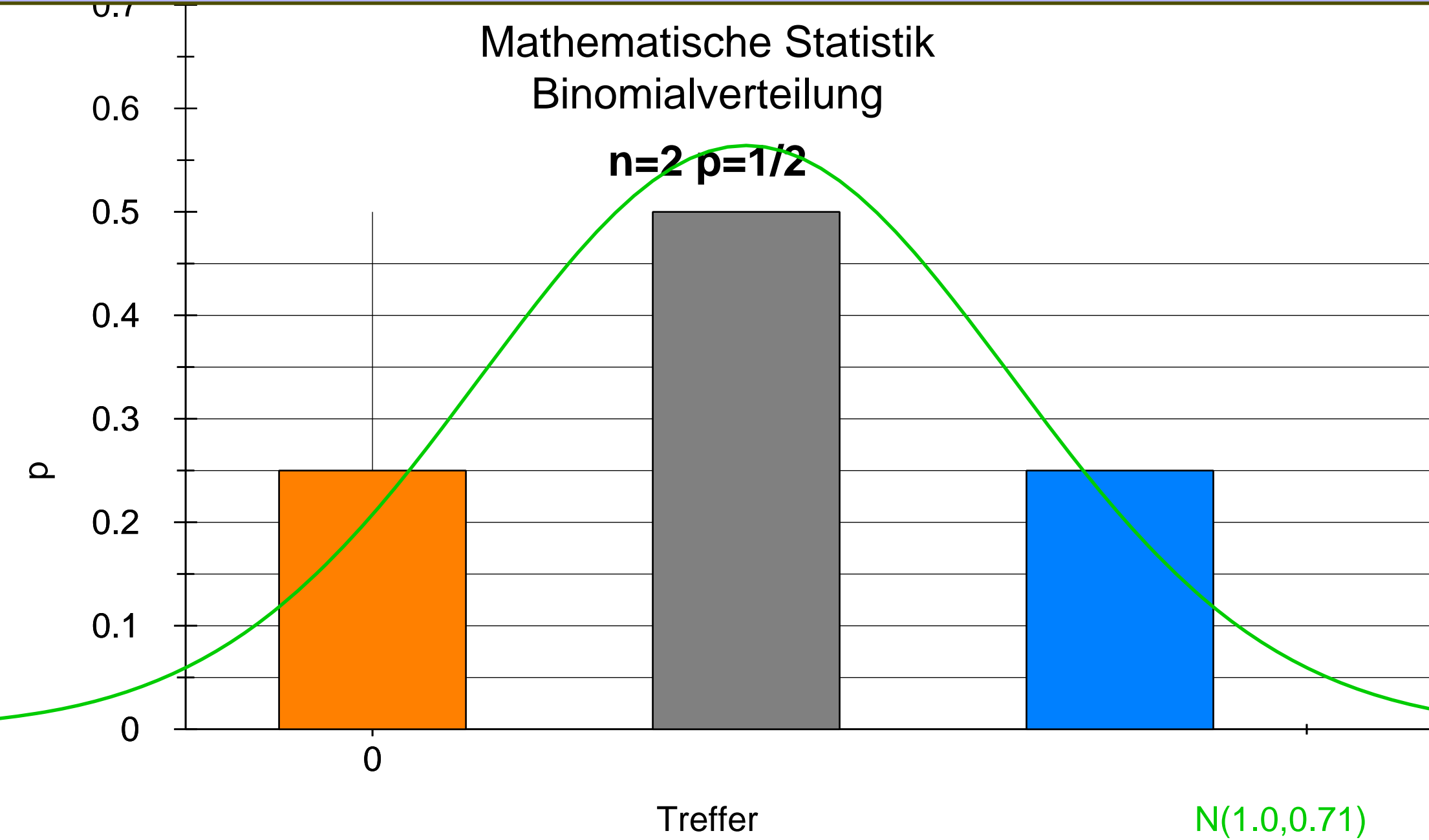
$n=2$ $p=1/2$



Mathematische Statistik

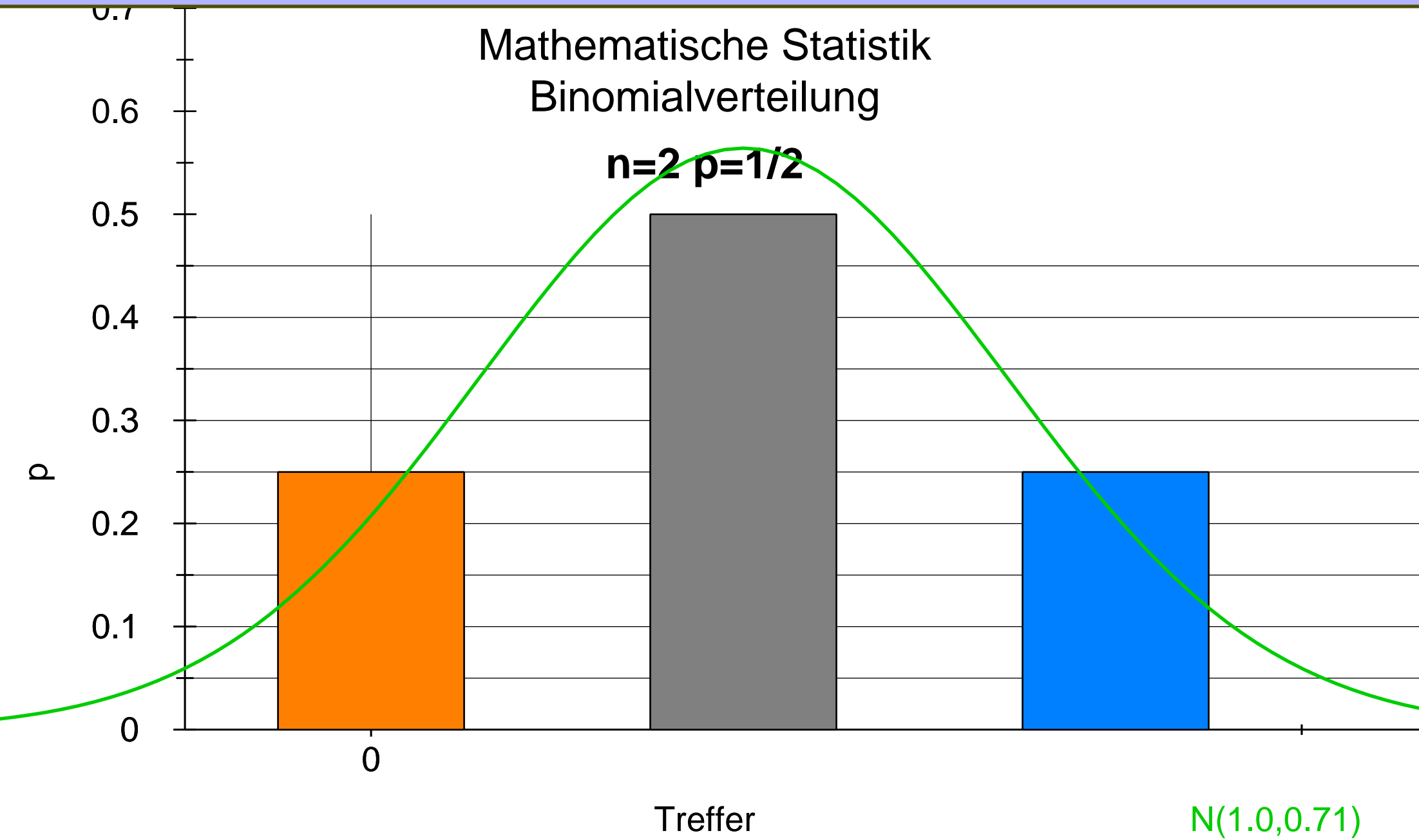
Binomialverteilung

$n=2$ $p=1/2$



Mathematische Statistik
Binomialverteilung

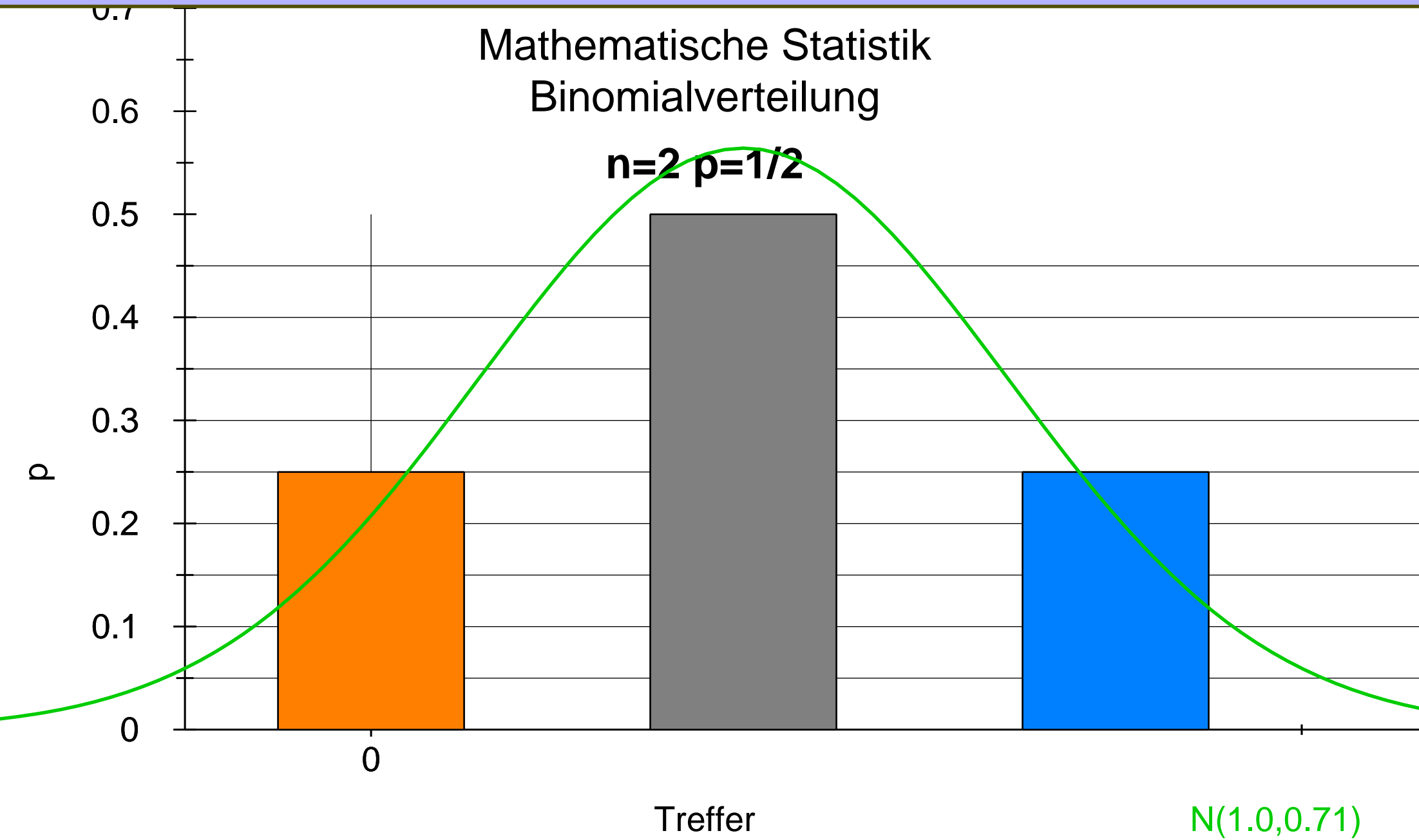
$n=2$ $p=1/2$



$N(1.0, 0.71)$

Mathematische Statistik
Binomialverteilung

$n=2$ $p=1/2$

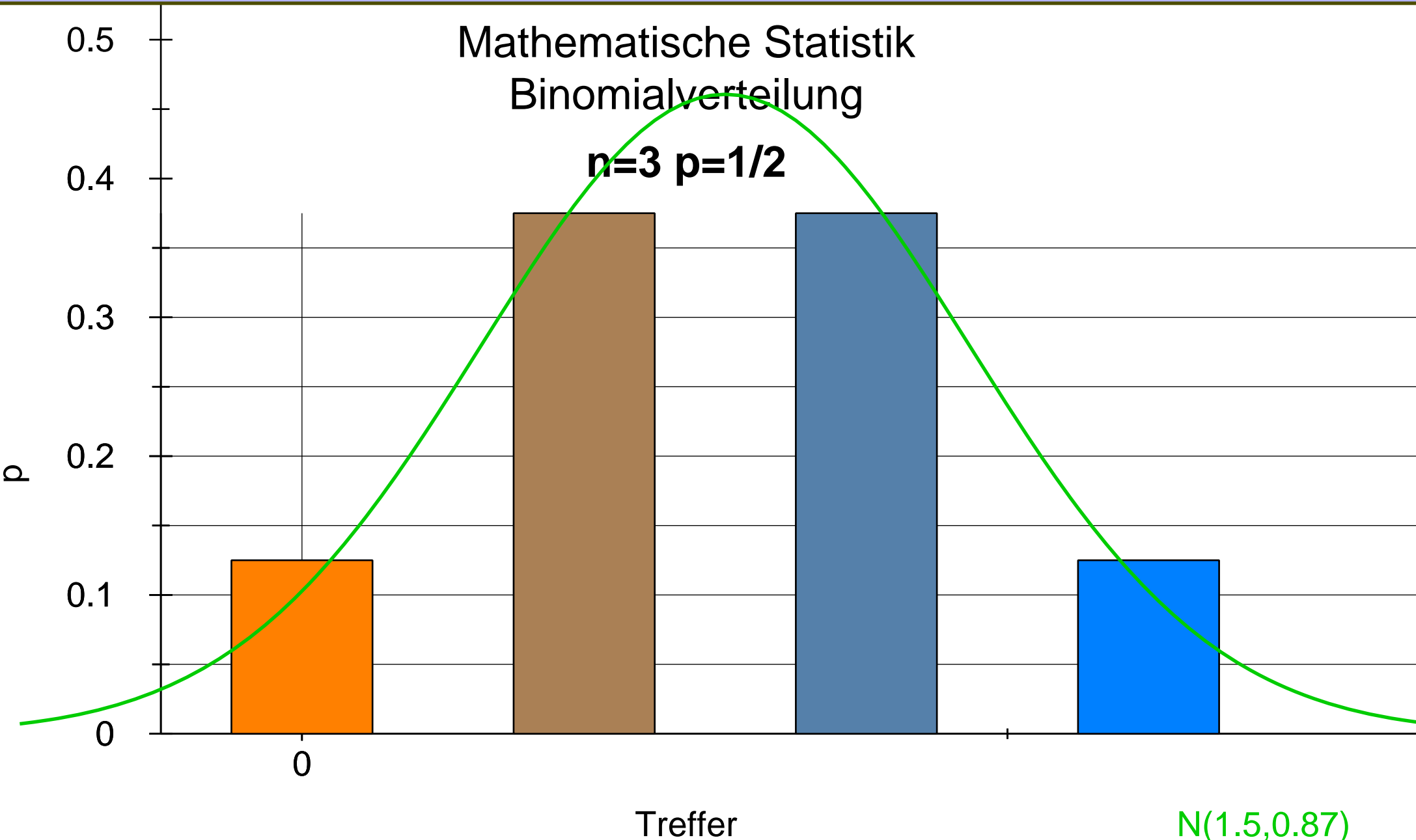


$N(1.0,0.71)$

Mathematische Statistik

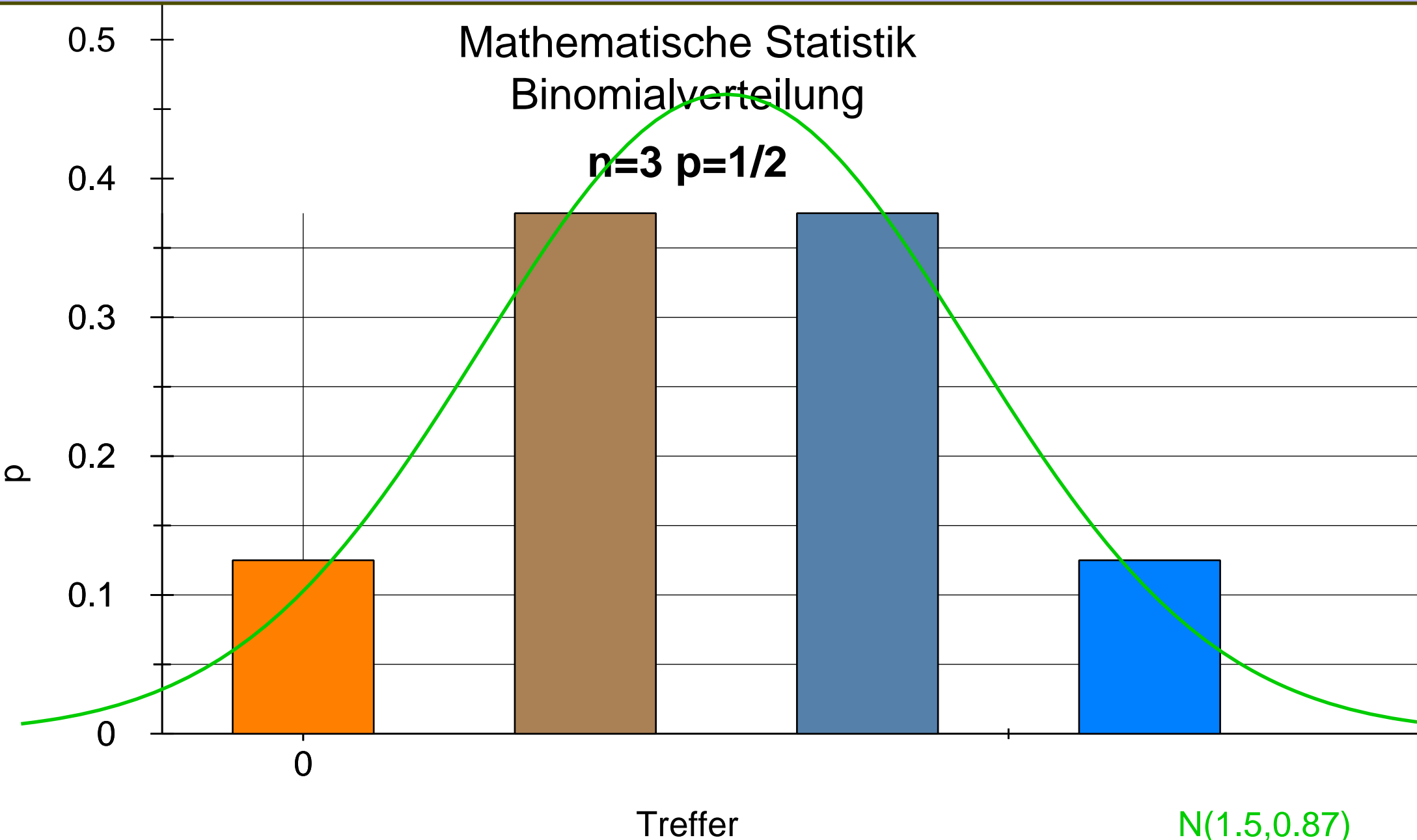
Binomialverteilung

$n=3$ $p=1/2$



Mathematische Statistik
Binomialverteilung

n=3 p=1/2

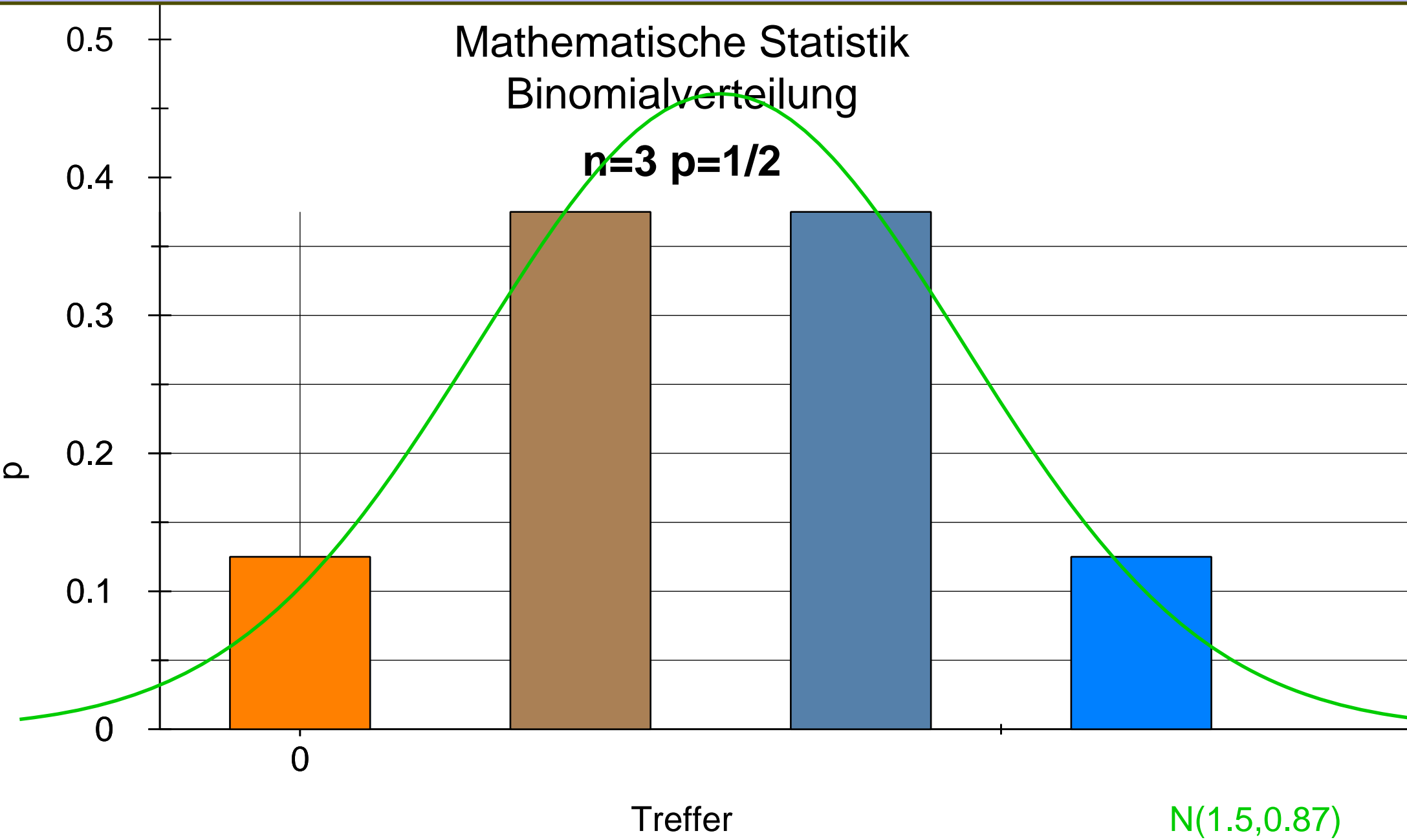


N(1.5,0.87)

Mathematische Statistik

Binomialverteilung

$n=3$ $p=1/2$

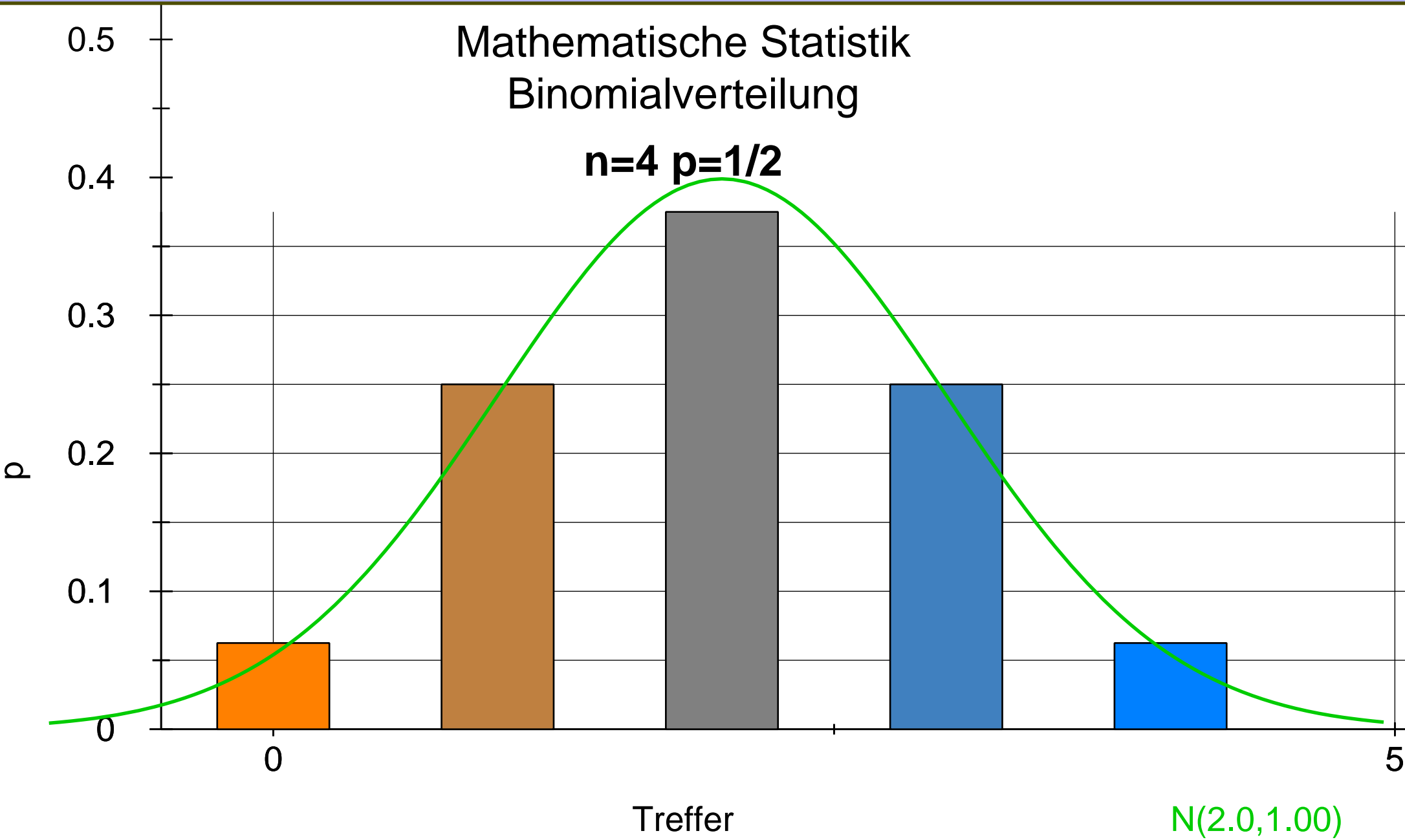


$N(1.5, 0.87)$

Mathematische Statistik

Binomialverteilung

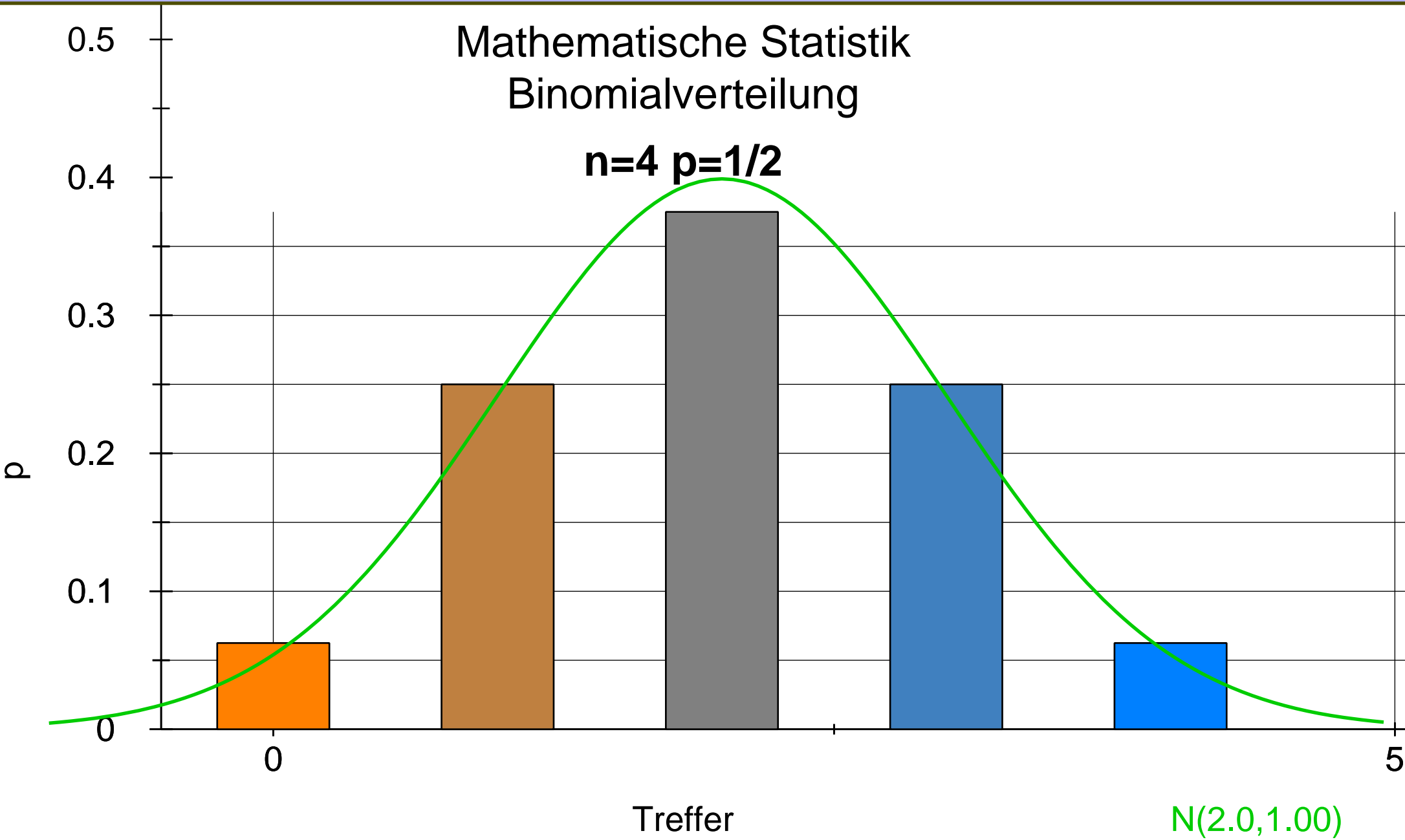
n=4 p=1/2



Mathematische Statistik

Binomialverteilung

n=4 p=1/2

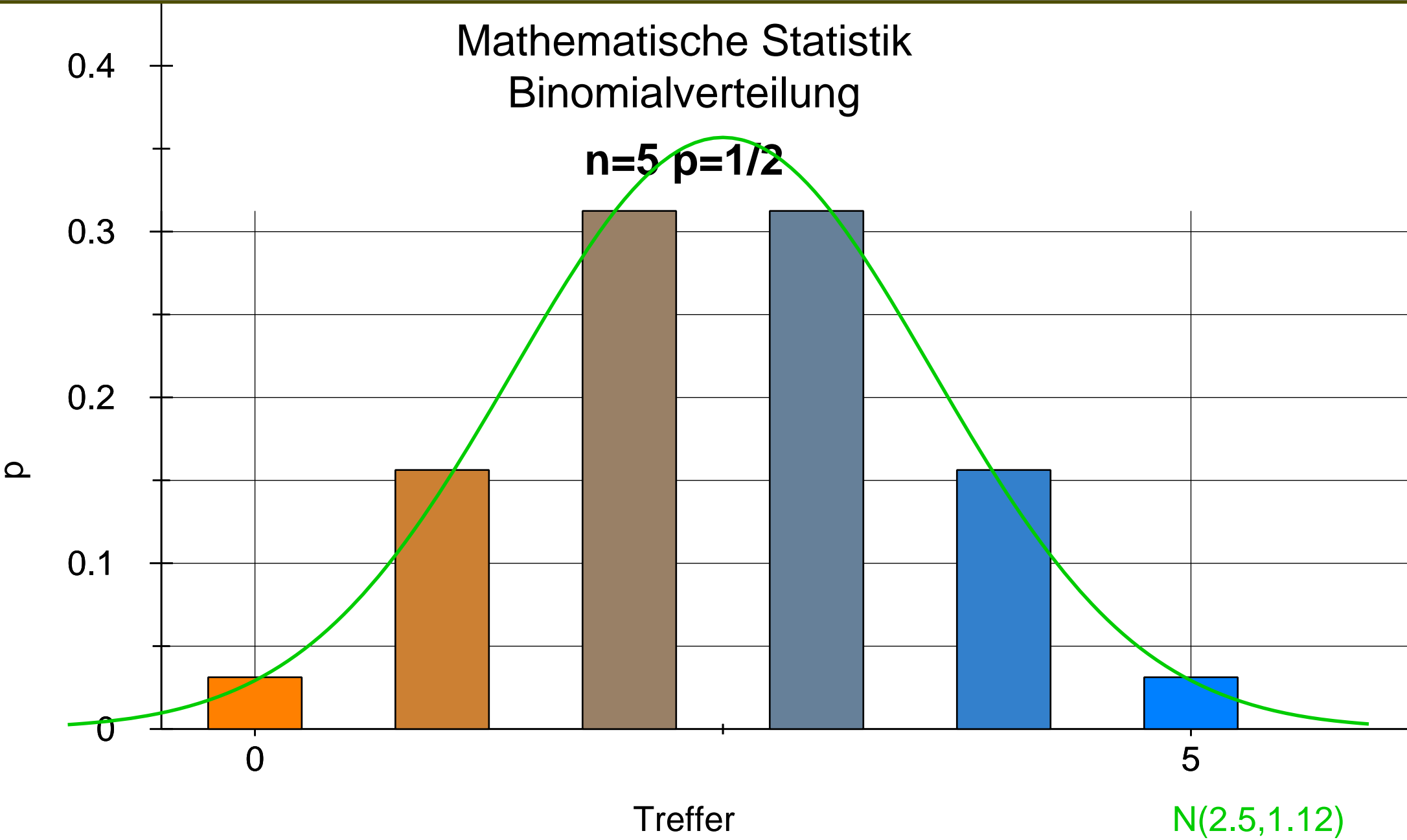


$N(2.0, 1.00)$

Mathematische Statistik

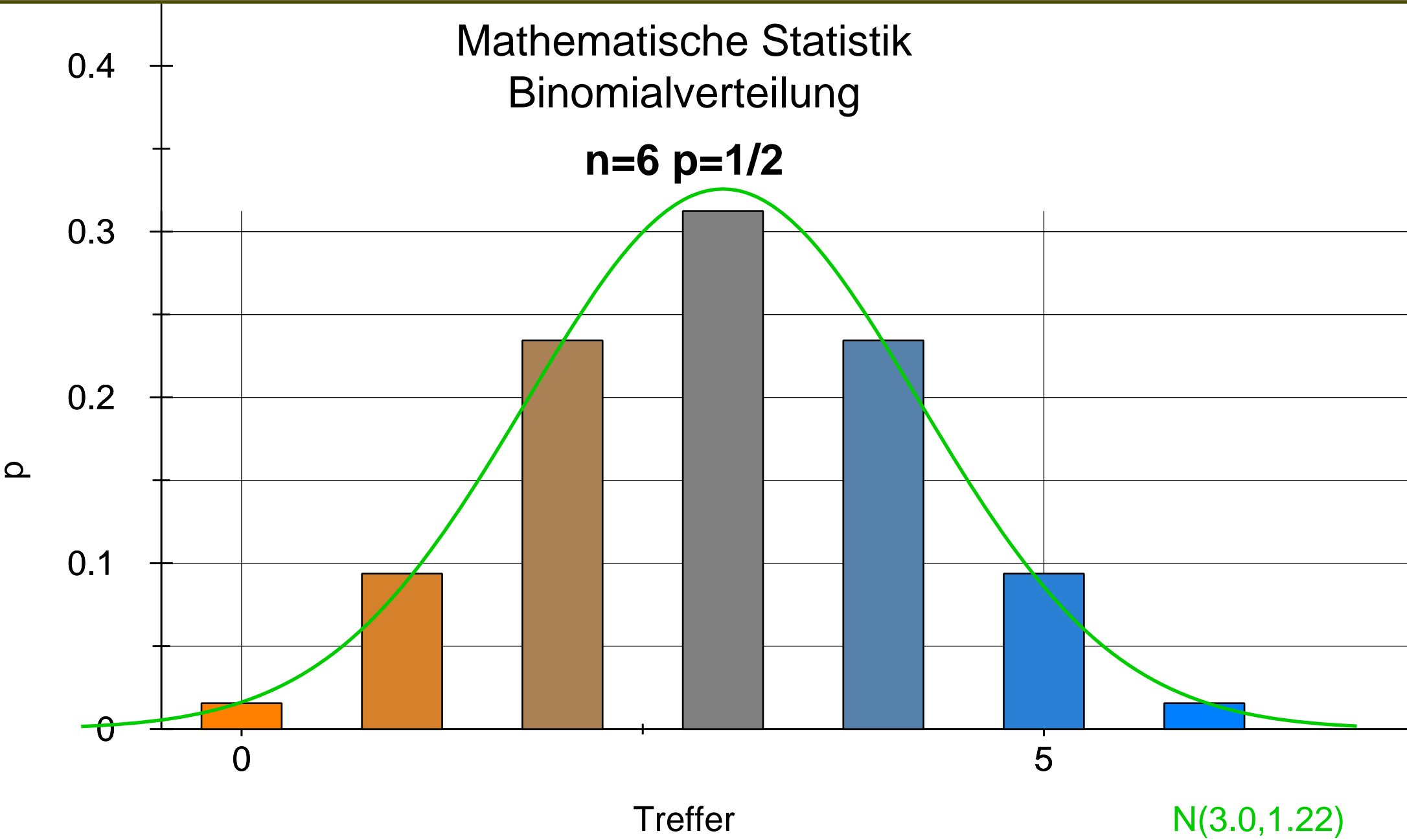
Binomialverteilung

$n=5$ $p=1/2$



Mathematische Statistik
Binomialverteilung

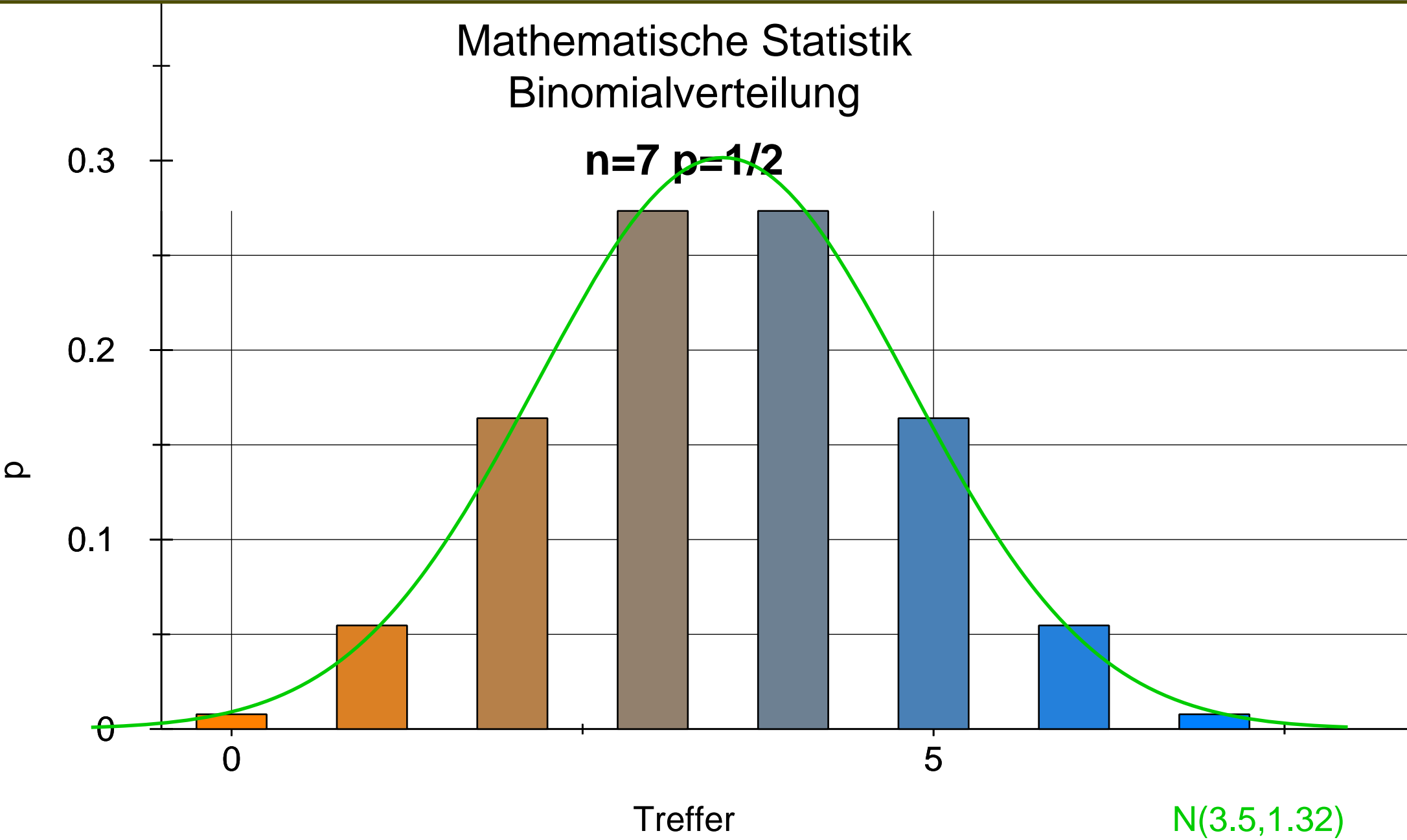
n=6 p=1/2



Mathematische Statistik

Binomialverteilung

$n=7$ $p=1/2$

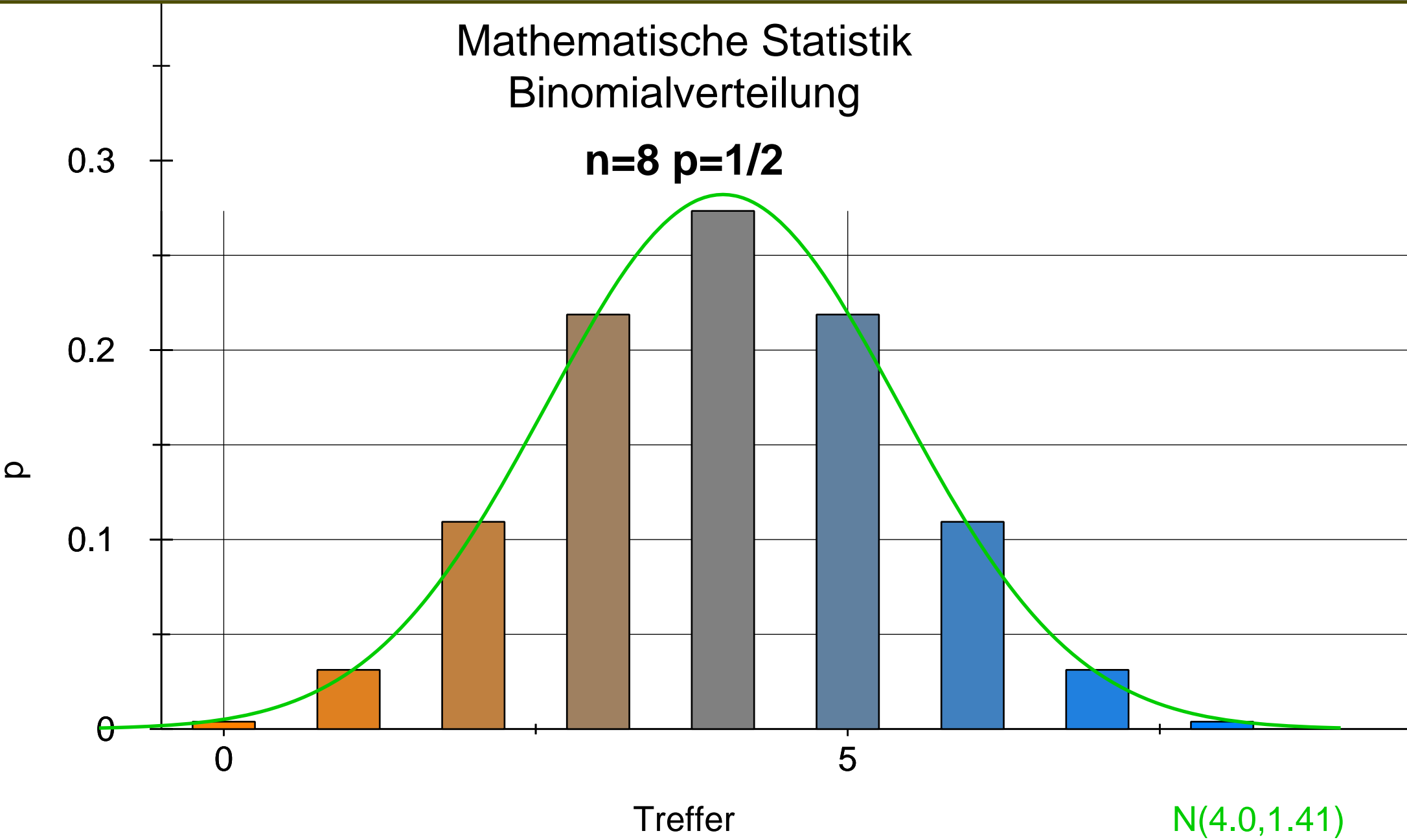


$N(3.5, 1.32)$

Mathematische Statistik

Binomialverteilung

n=8 p=1/2



Mathematische Statistik

Binomialverteilung

n=9 p=1/2

p

0.3
0.2
0.1
0

0

5

10

Treffer

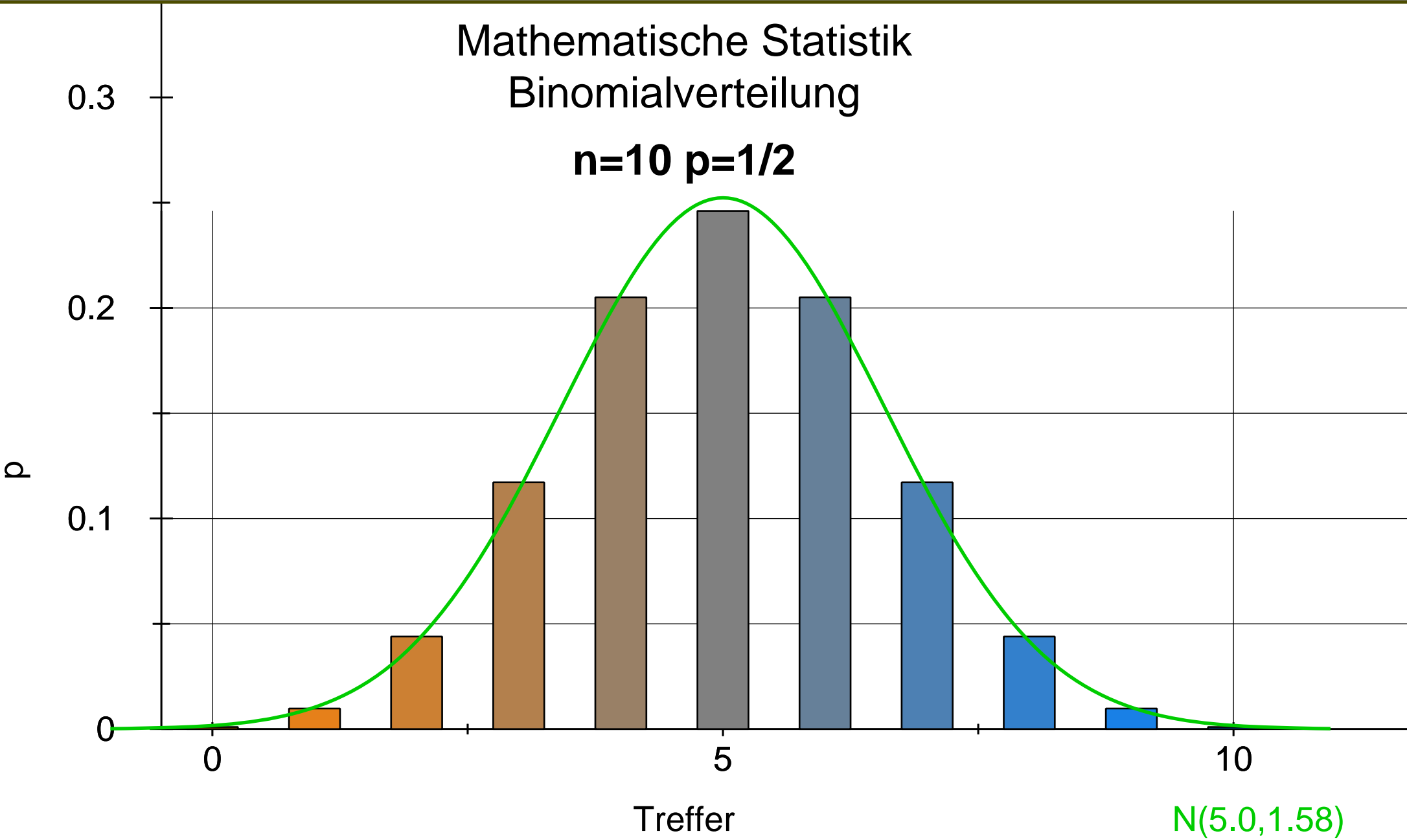
$N(4.5, 1.50)$



Mathematische Statistik

Binomialverteilung

n=10 p=1/2

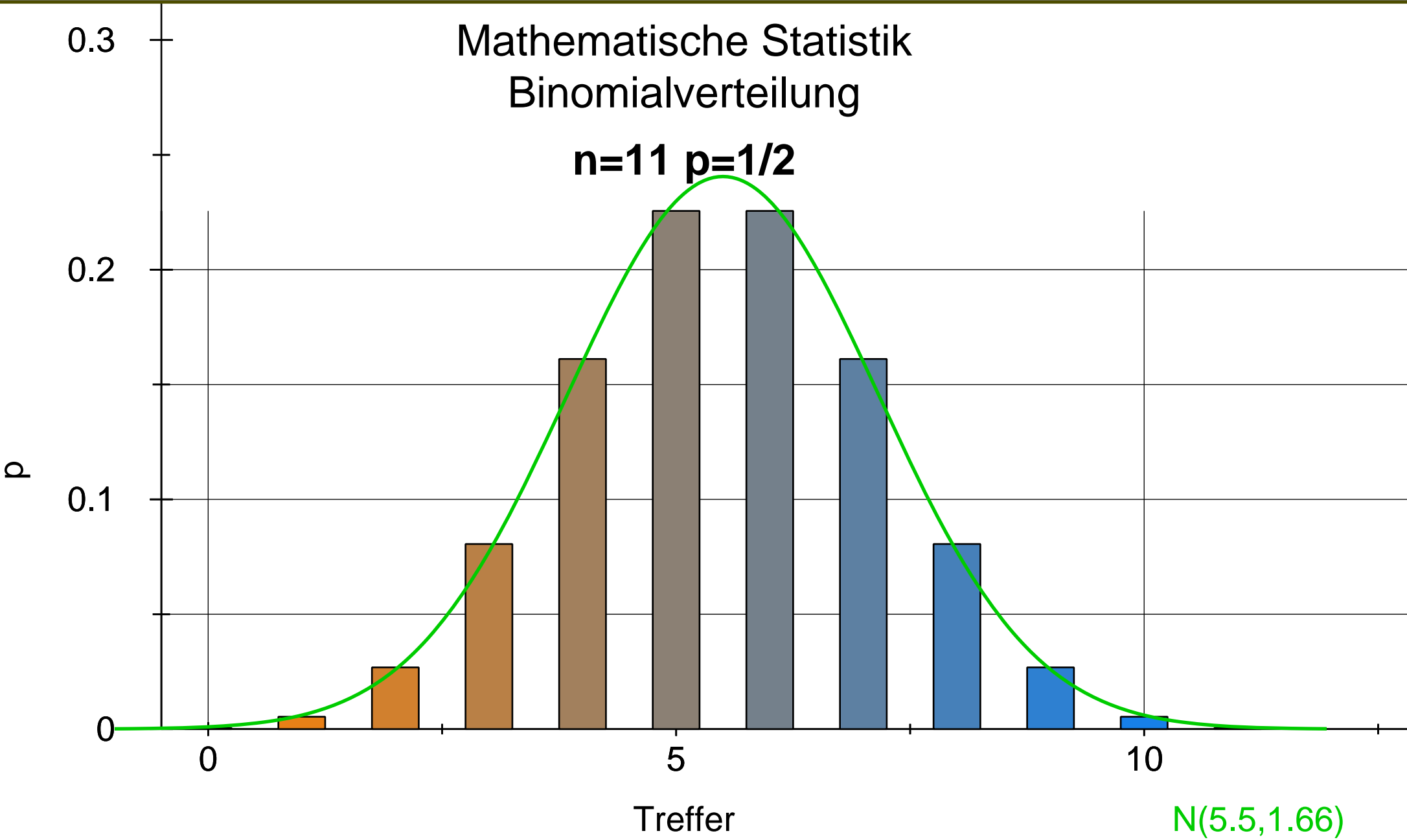


$N(5.0, 1.58)$

Mathematische Statistik

Binomialverteilung

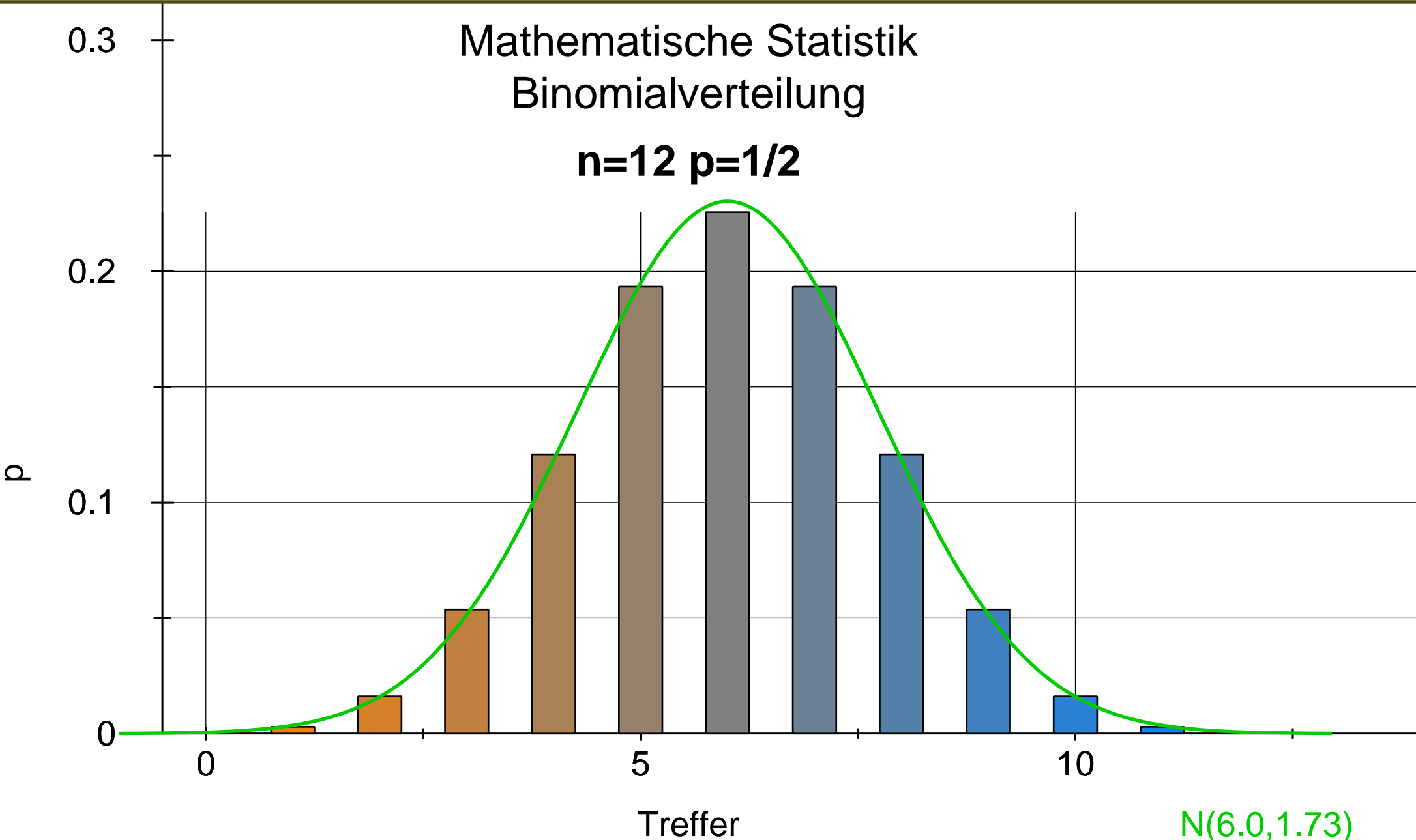
n=11 p=1/2



$N(5.5, 1.66)$

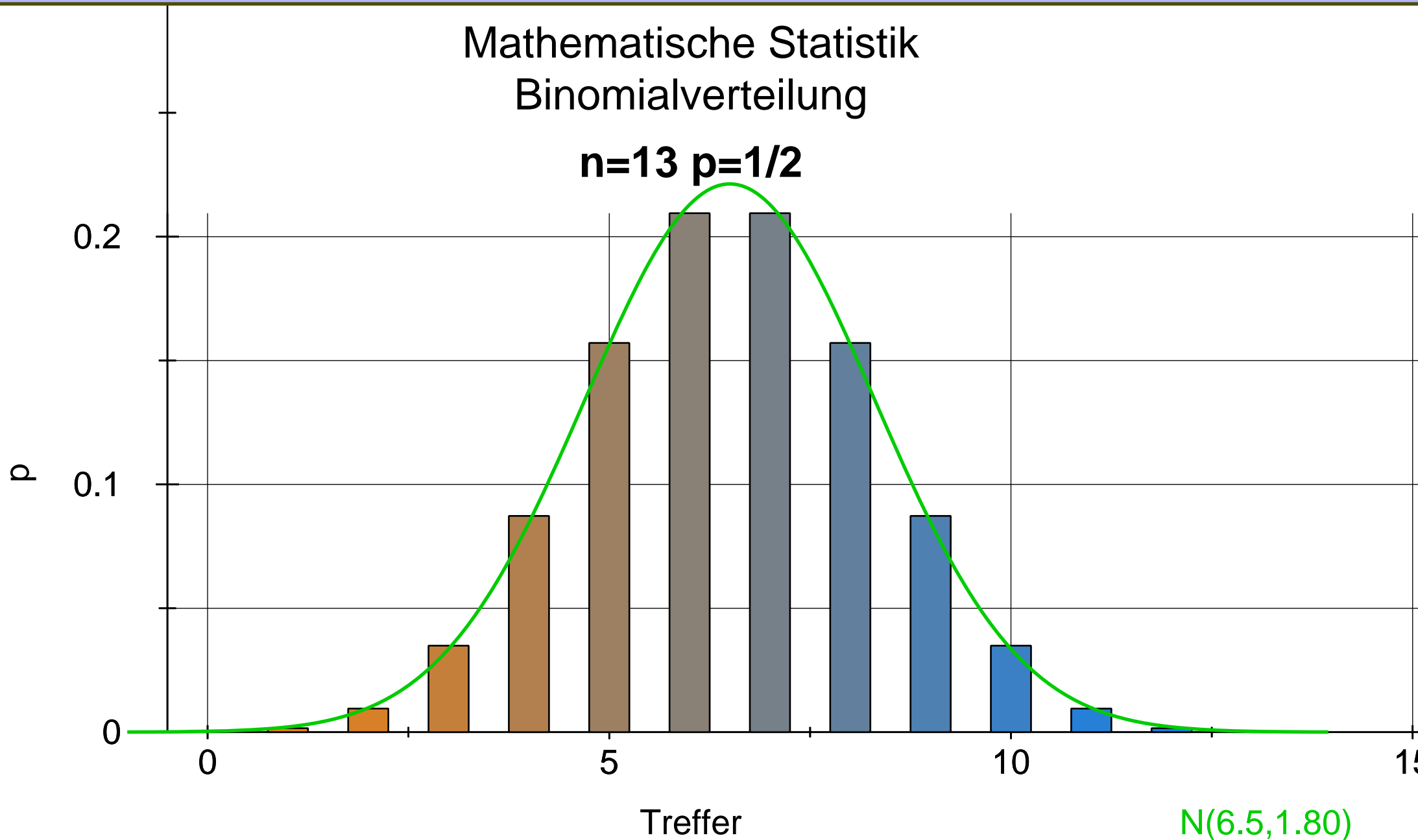
Mathematische Statistik
Binomialverteilung

n=12 p=1/2



Mathematische Statistik
Binomialverteilung

n=13 p=1/2



Mathematische Statistik

Binomialverteilung

$n=14$ $p=1/2$

p

0.2

0.1

0

0

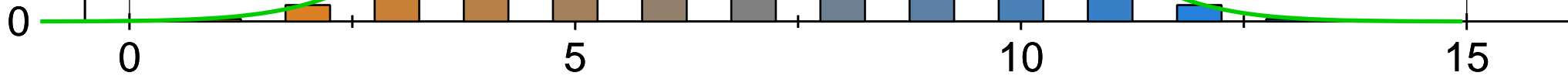
5

10

15

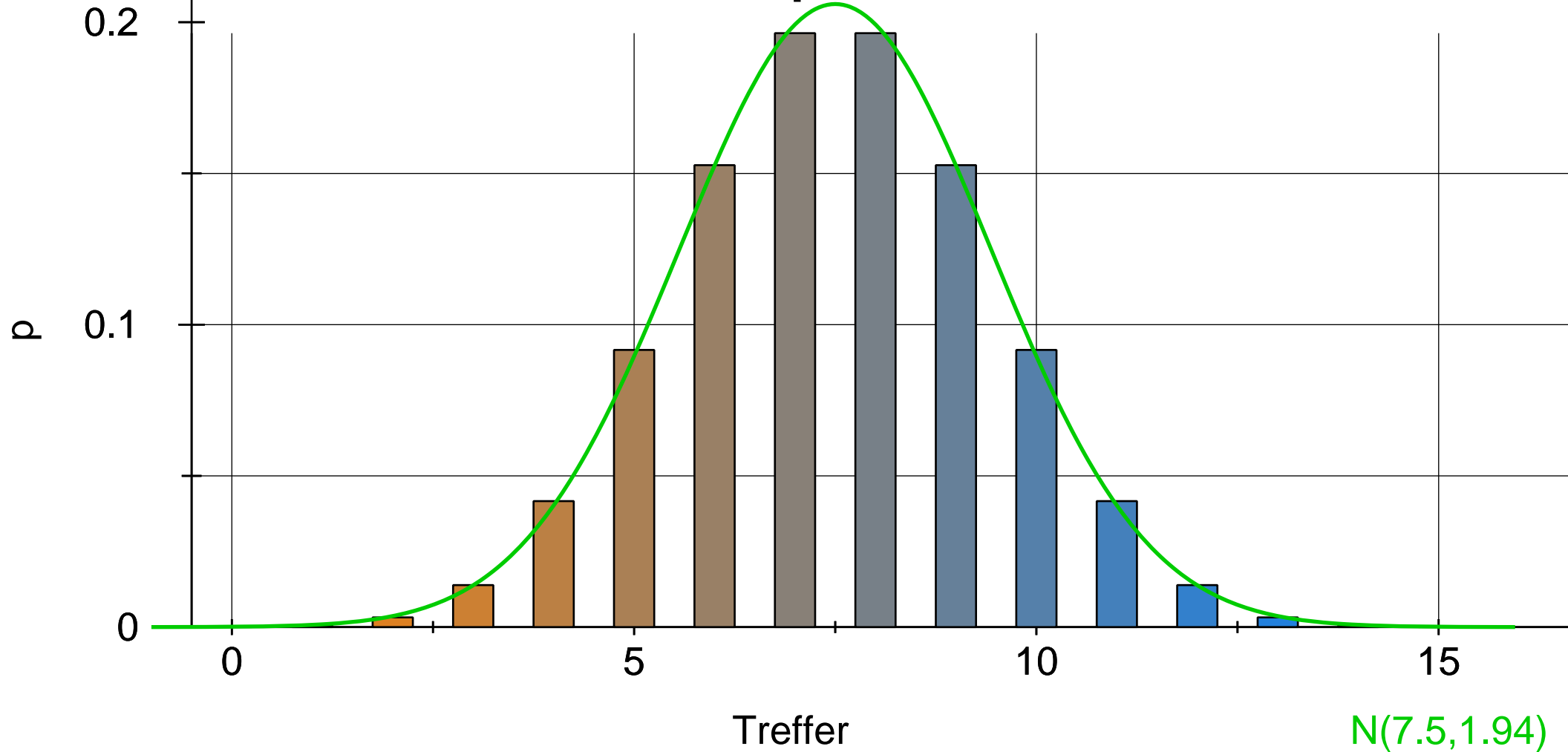
Treffer

$N(7.0, 1.87)$



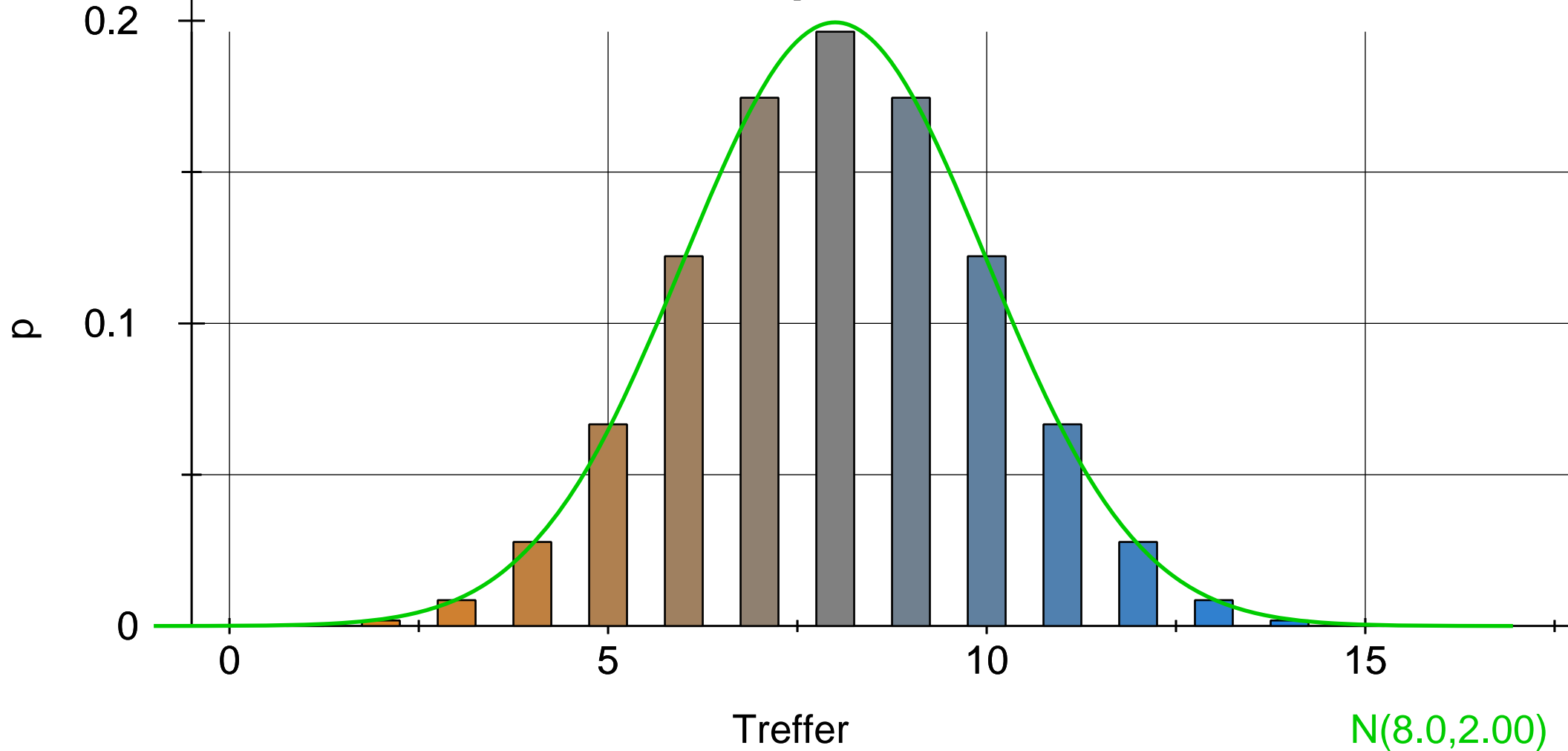
Mathematische Statistik
Binomialverteilung

n=15 p=1/2



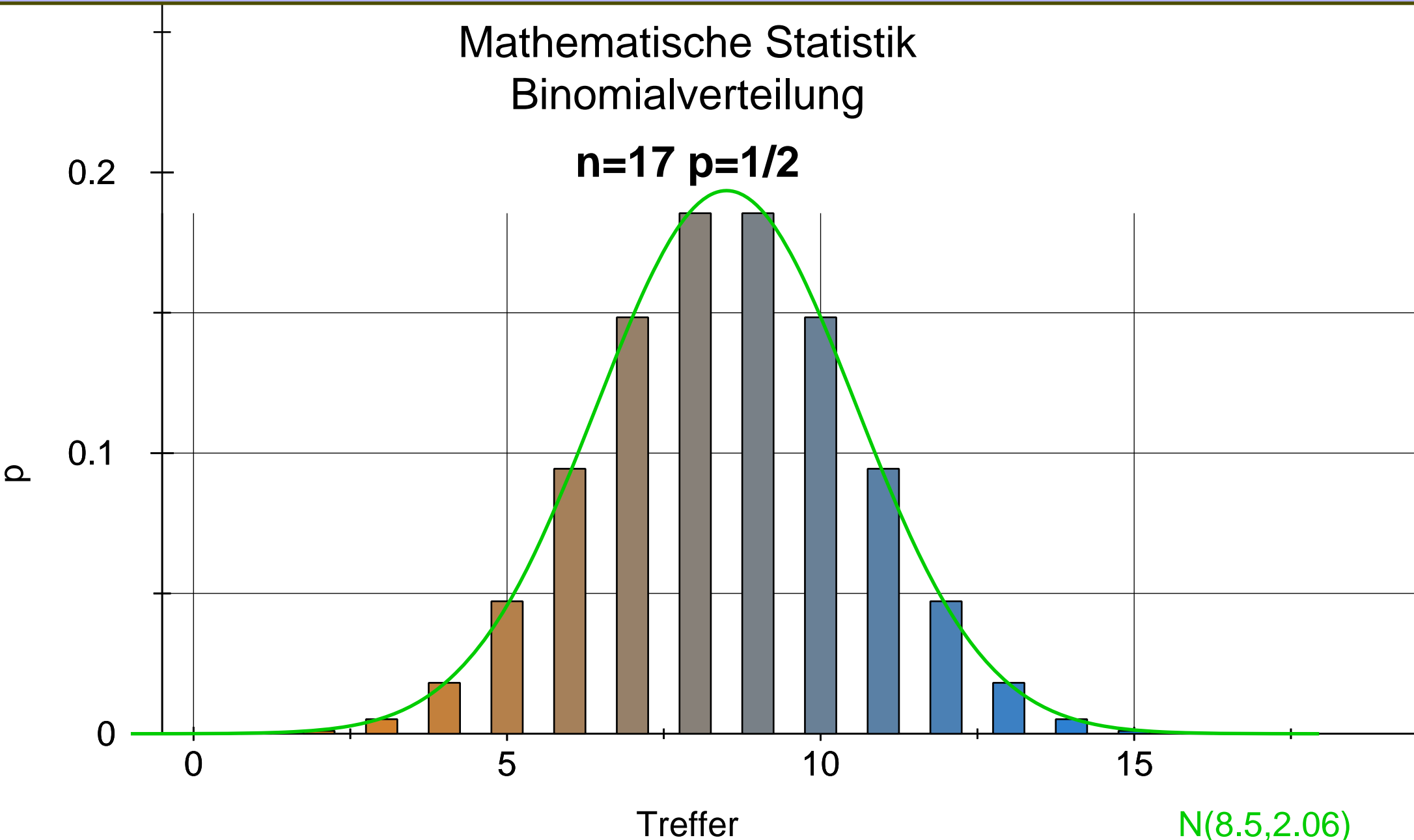
Mathematische Statistik
Binomialverteilung

n=16 p=1/2



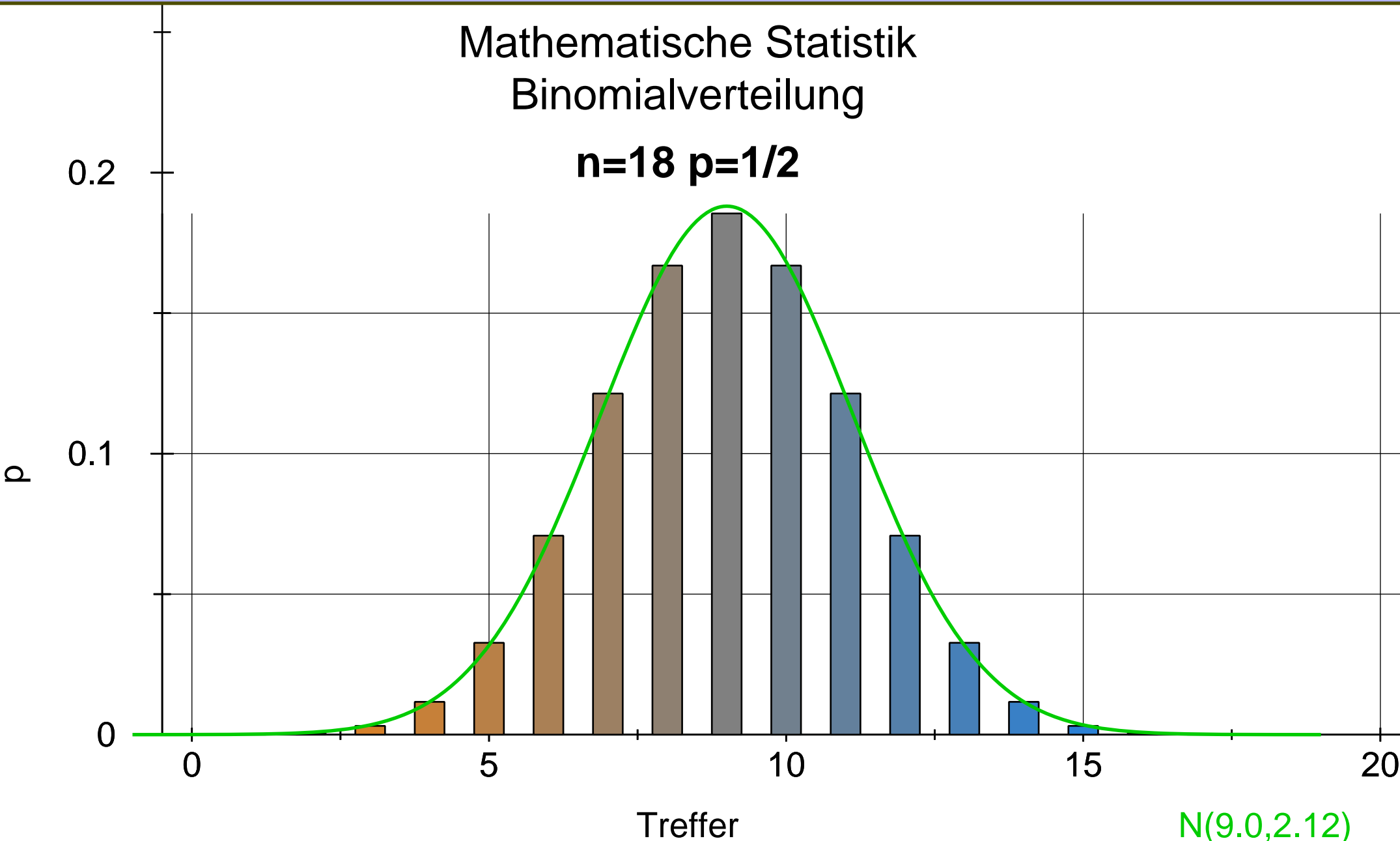
Mathematische Statistik
Binomialverteilung

n=17 p=1/2



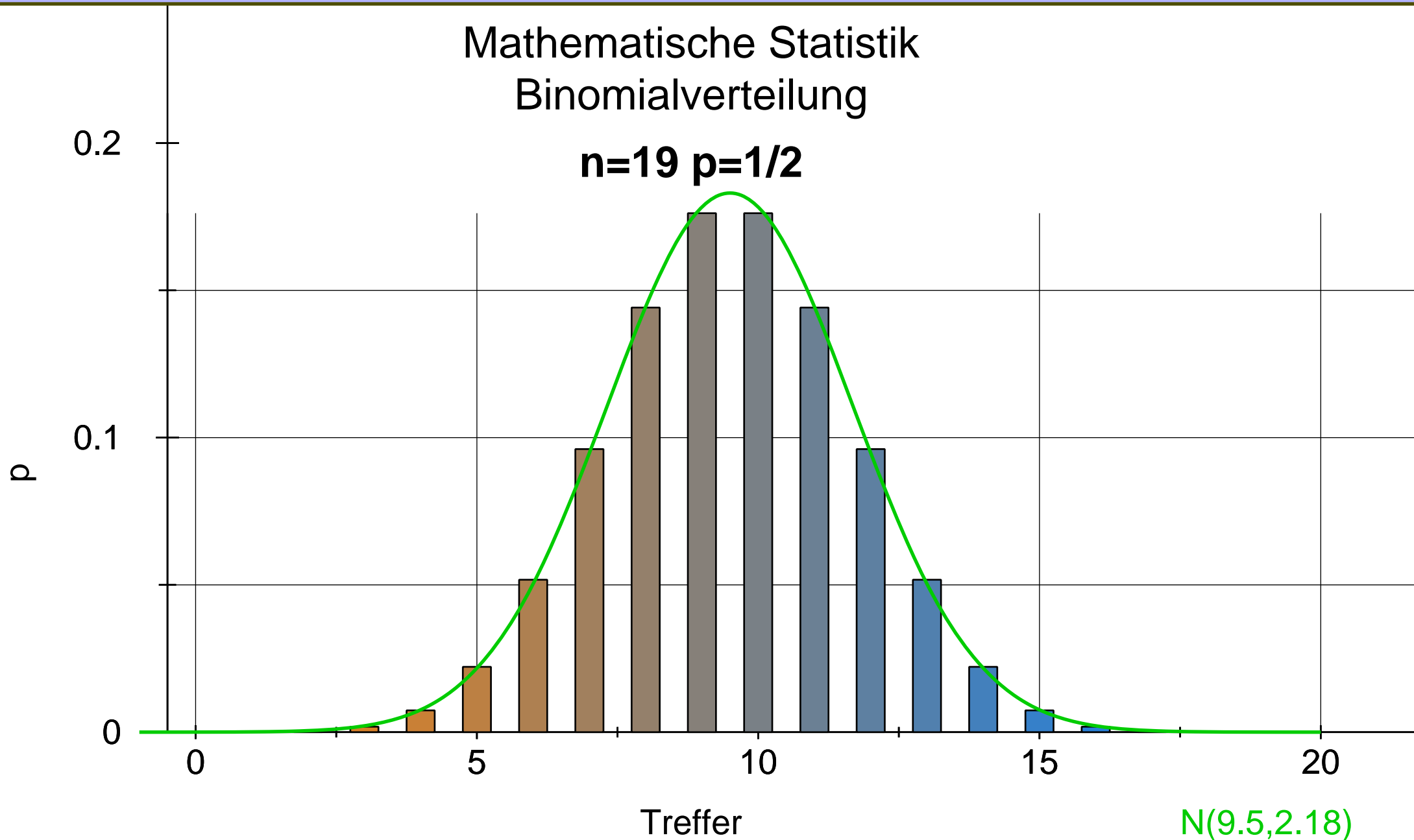
Mathematische Statistik
Binomialverteilung

n=18 p=1/2



Mathematische Statistik
Binomialverteilung

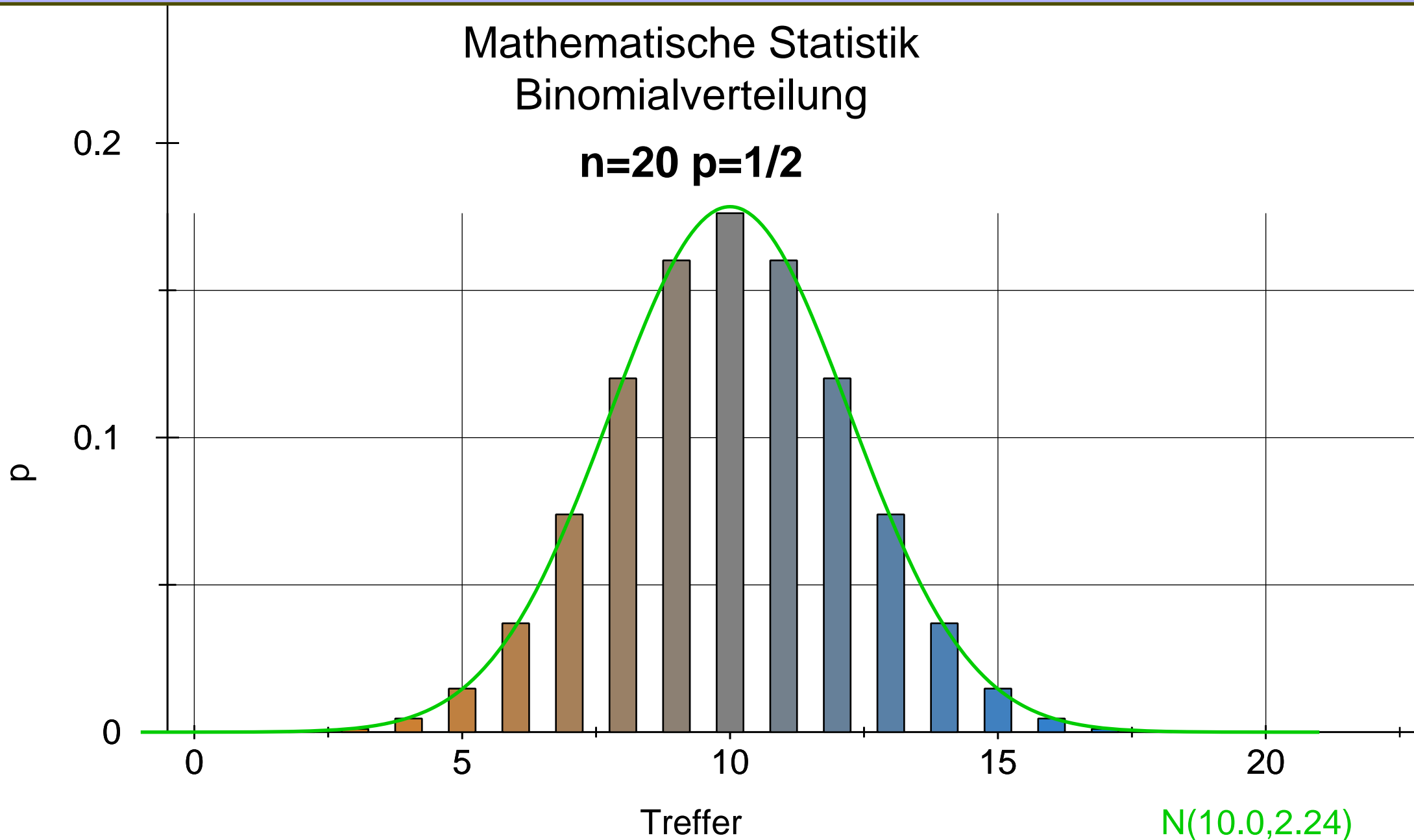
n=19 p=1/2



Mathematische Statistik

Binomialverteilung

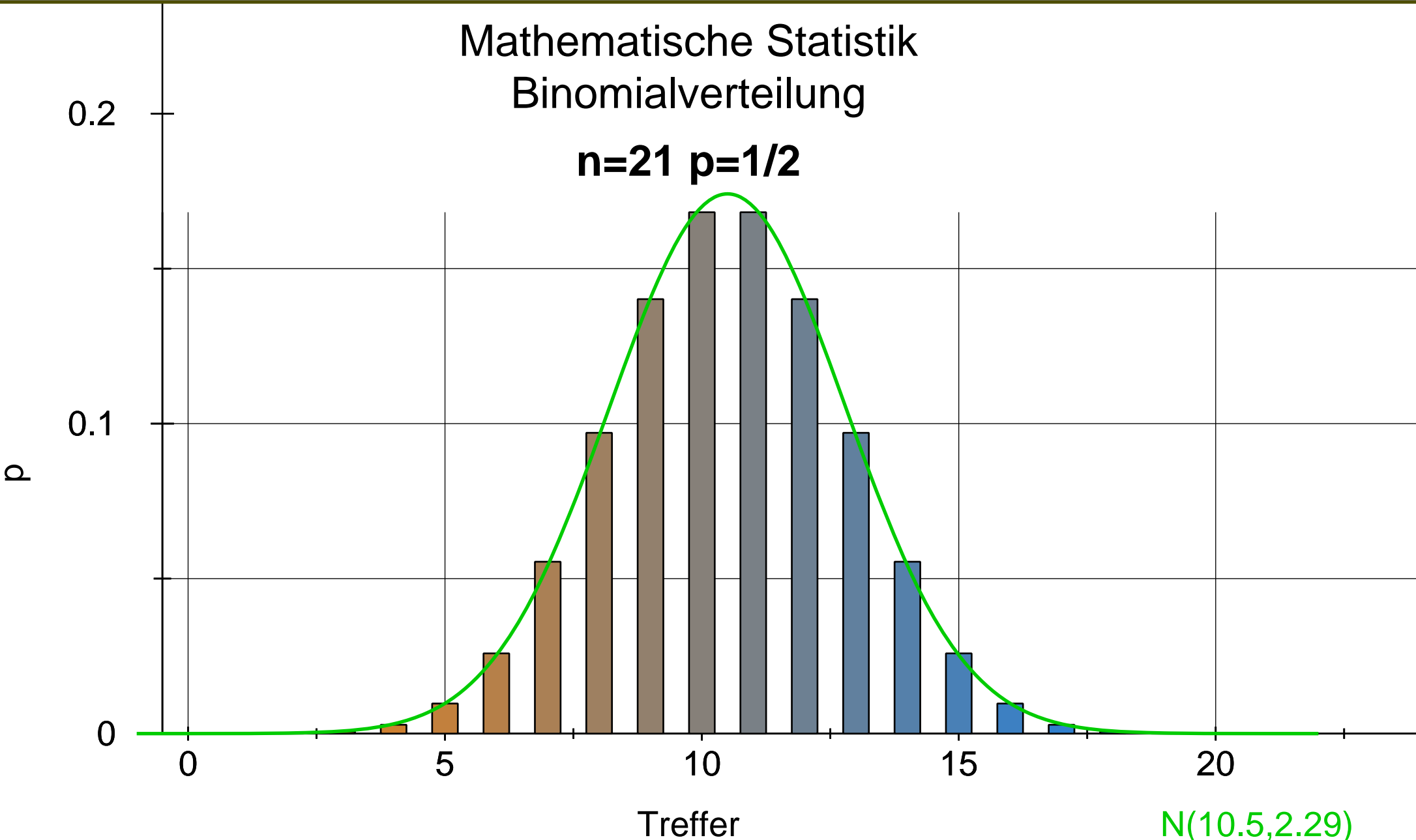
n=20 p=1/2



$N(10.0, 2.24)$

Mathematische Statistik
Binomialverteilung

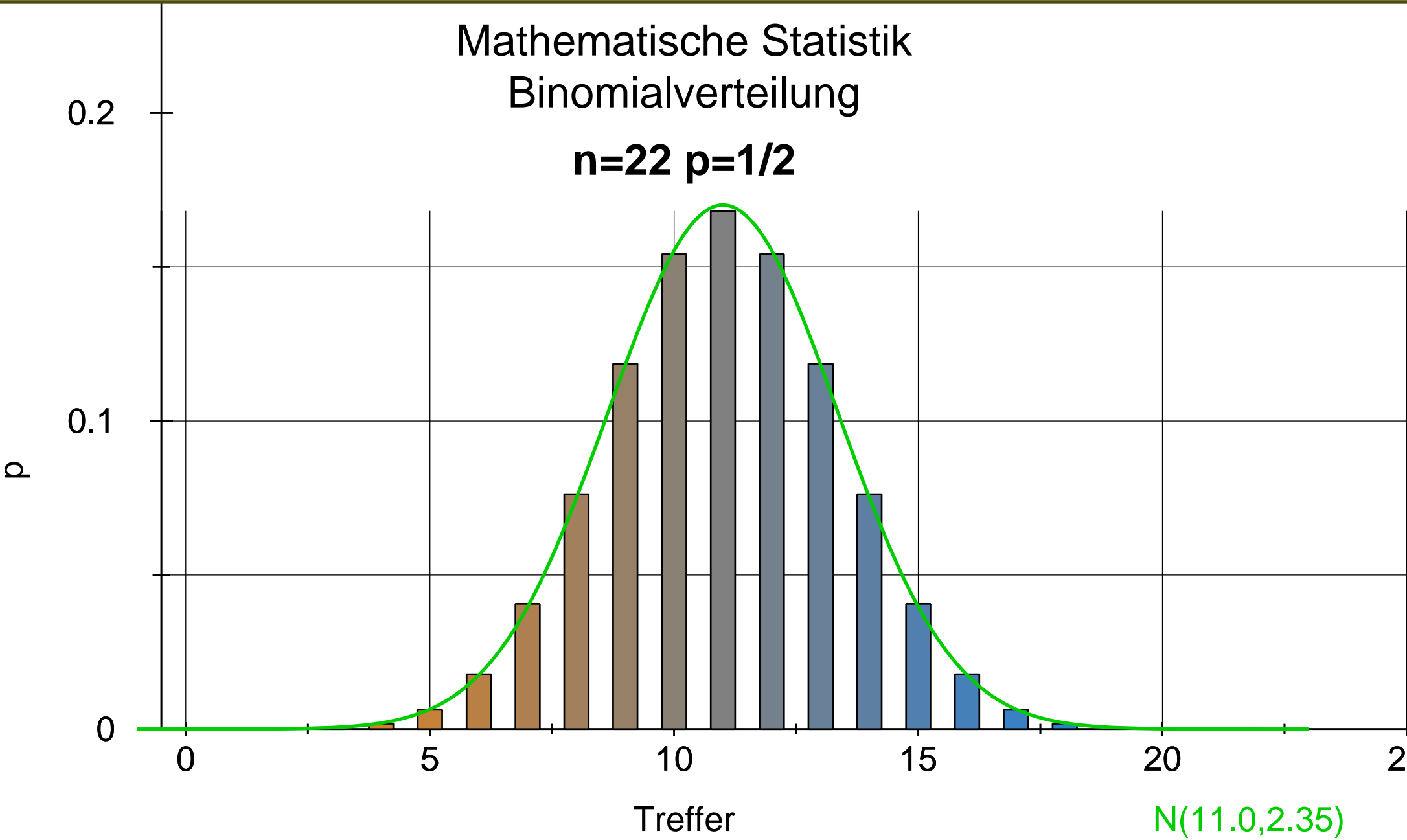
n=21 p=1/2



Mathematische Statistik

Binomialverteilung

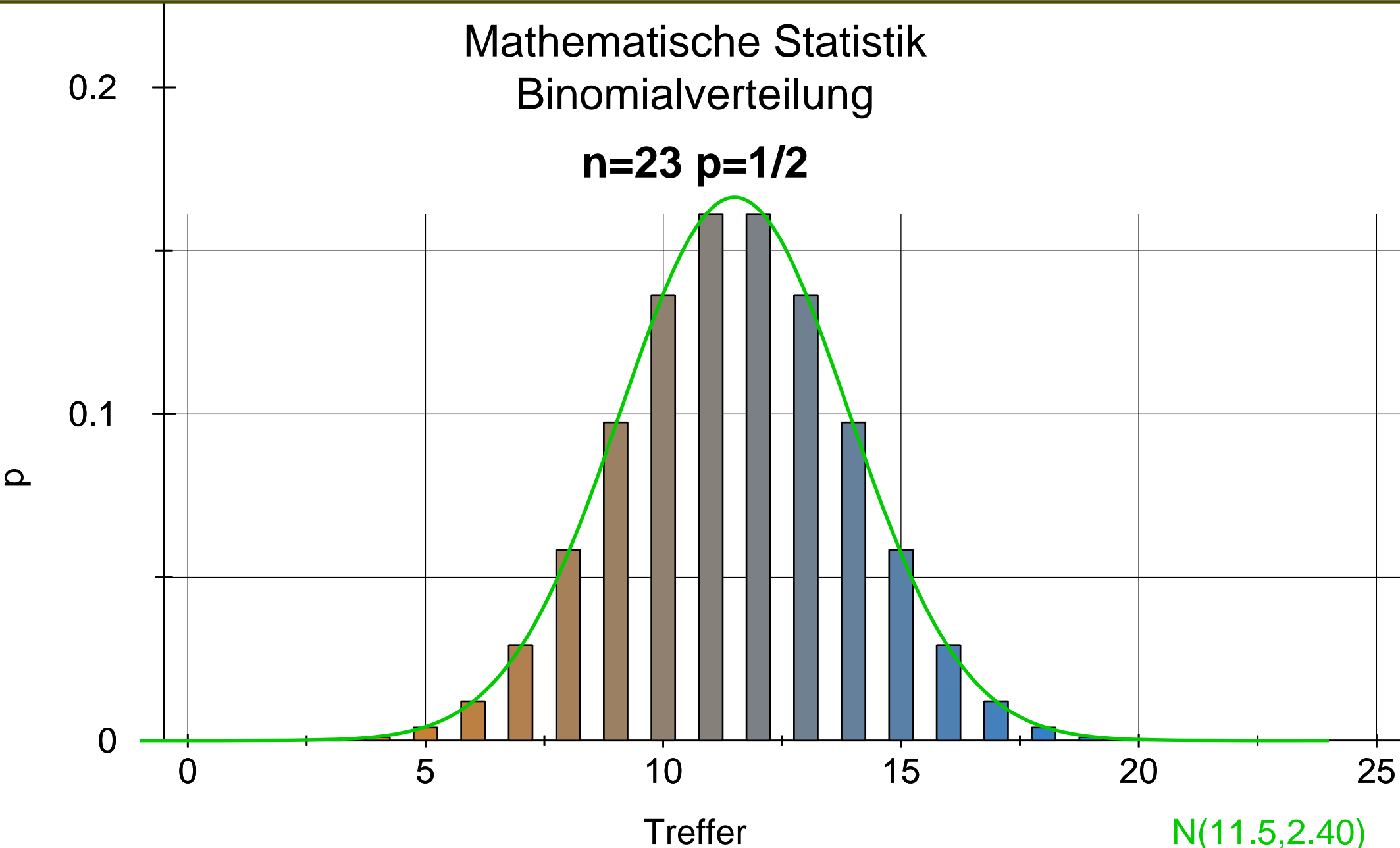
n=22 p=1/2



Mathematische Statistik

Binomialverteilung

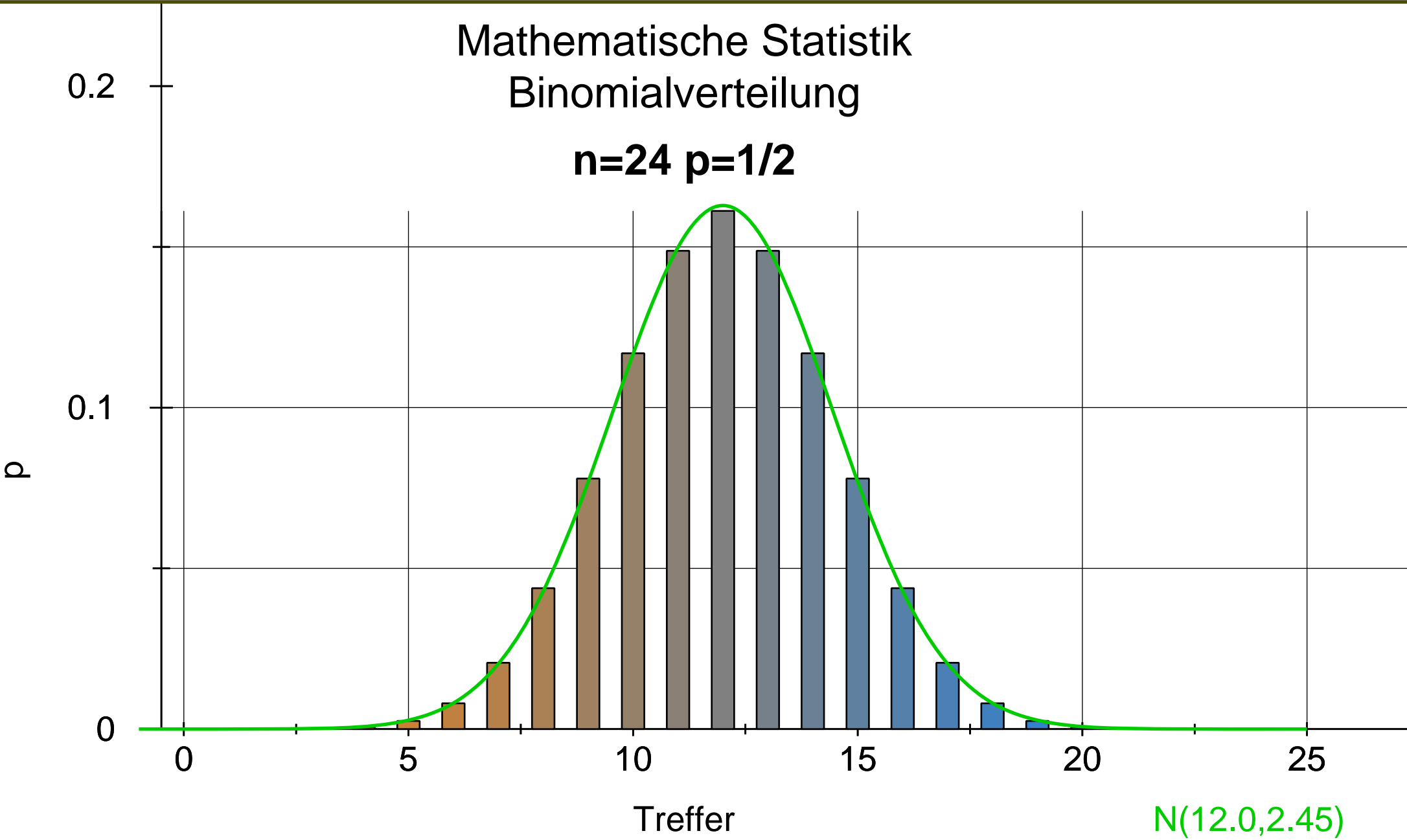
n=23 p=1/2



Mathematische Statistik

Binomialverteilung

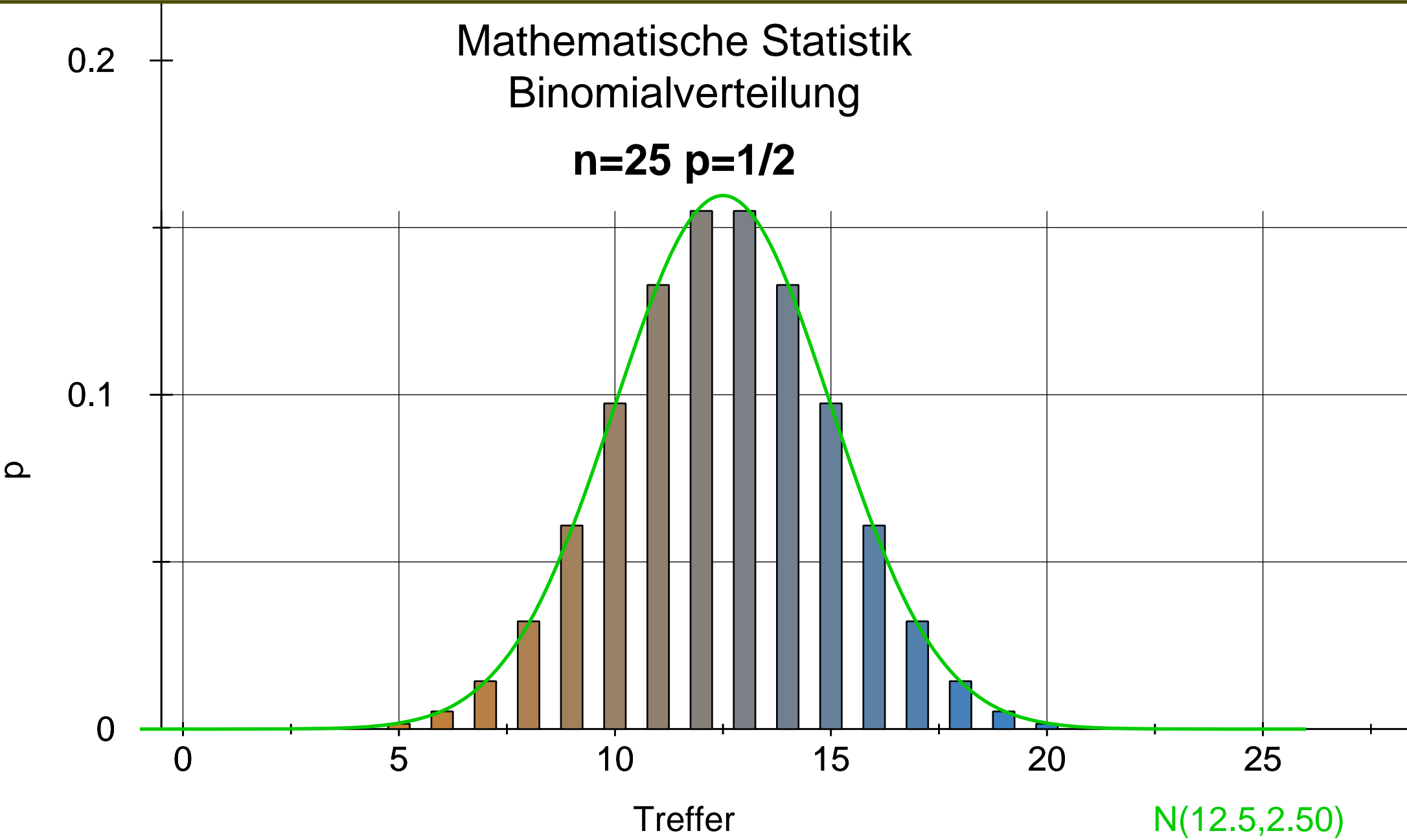
n=24 p=1/2



$N(12.0, 2.45)$

Mathematische Statistik
Binomialverteilung

n=25 p=1/2

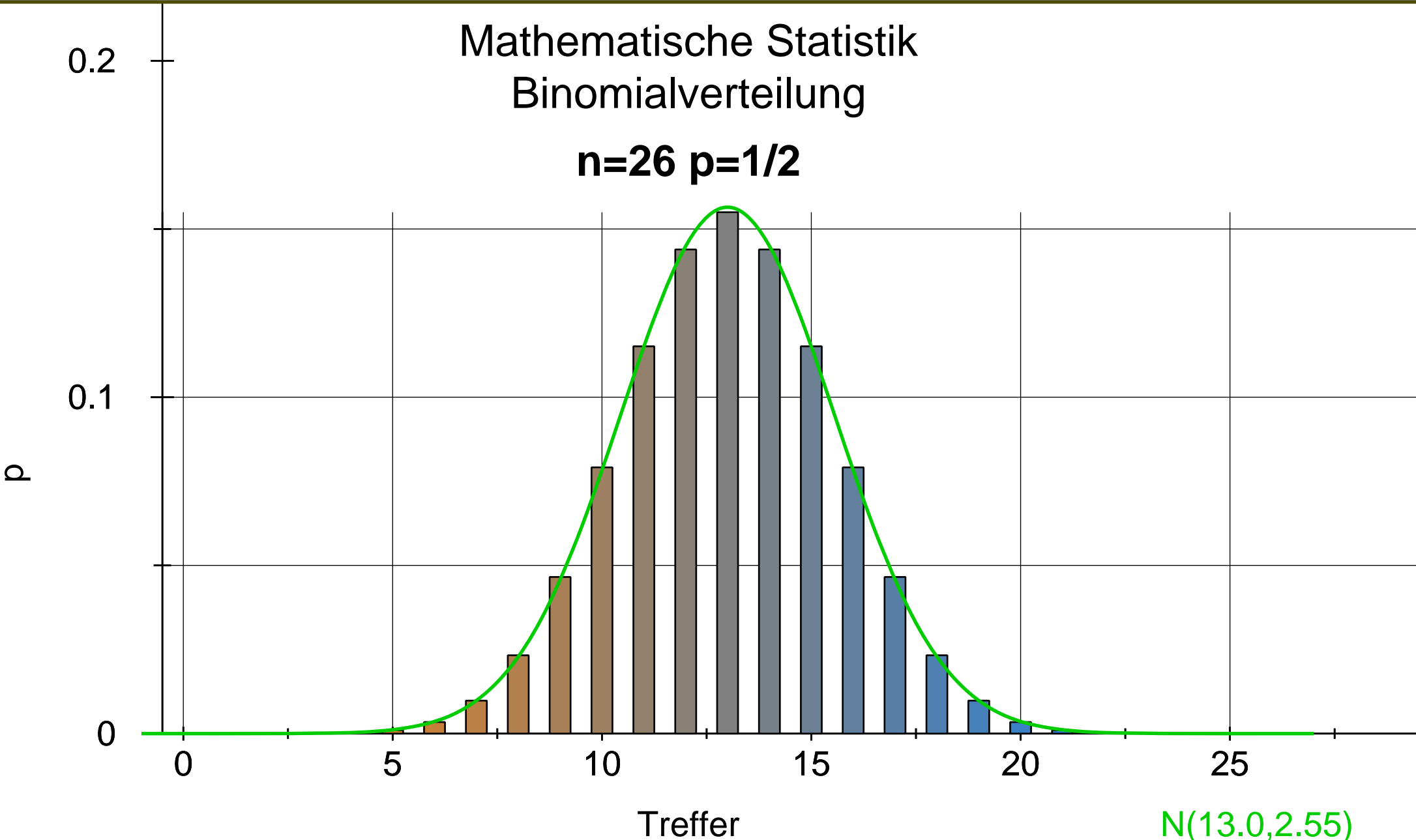


$N(12.5, 2.50)$

Mathematische Statistik

Binomialverteilung

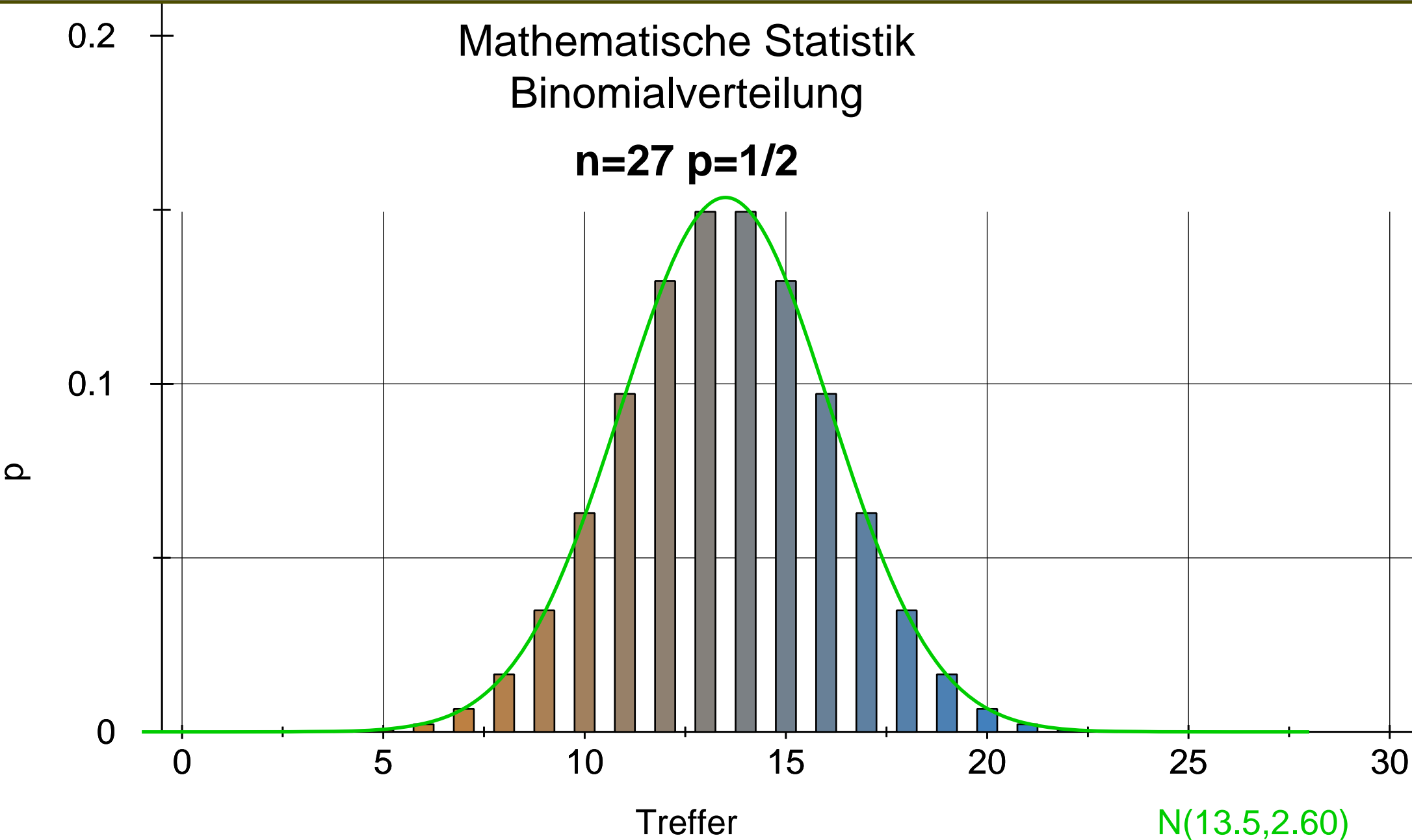
n=26 p=1/2



$N(13.0, 2.55)$

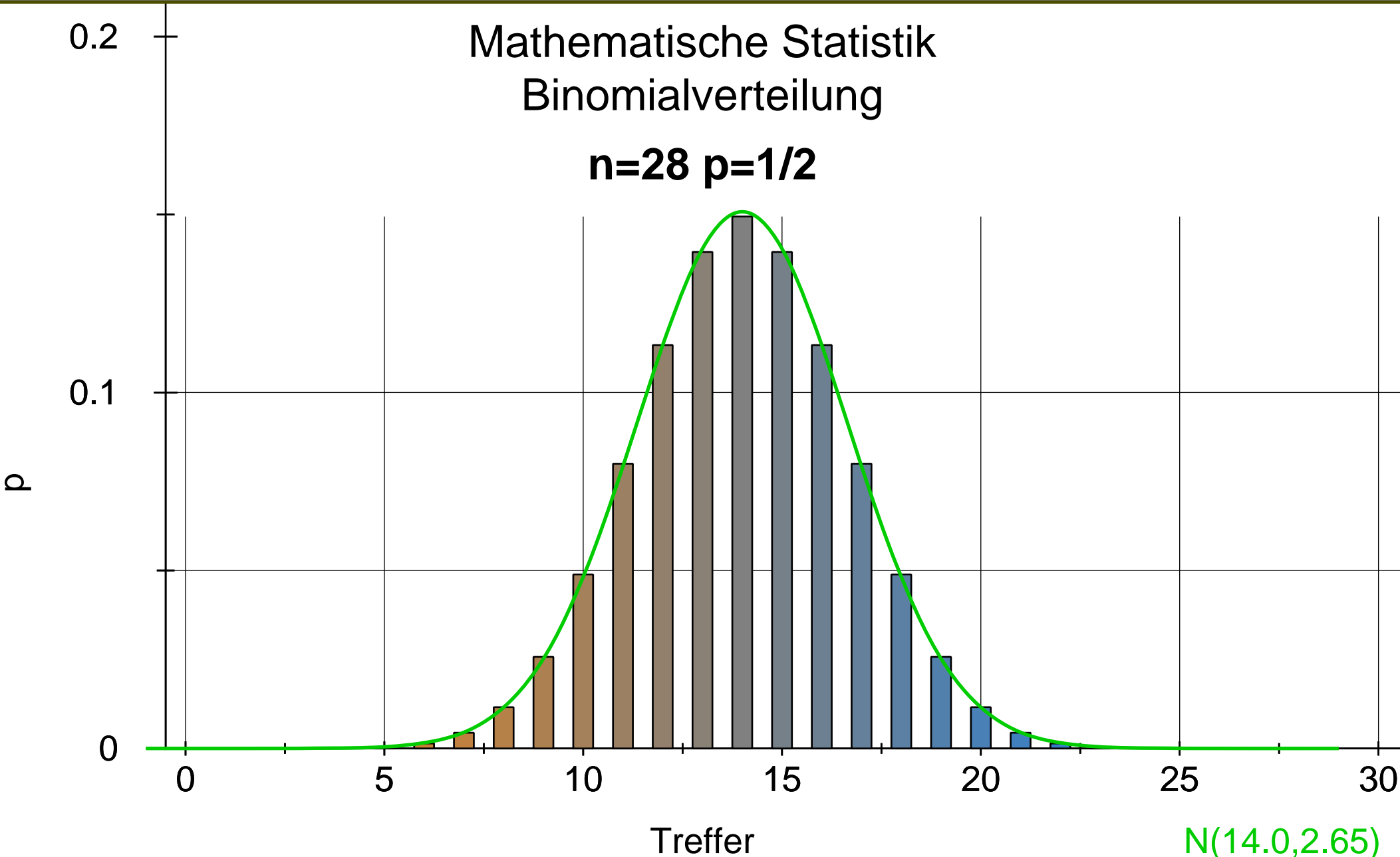
Mathematische Statistik
Binomialverteilung

n=27 p=1/2



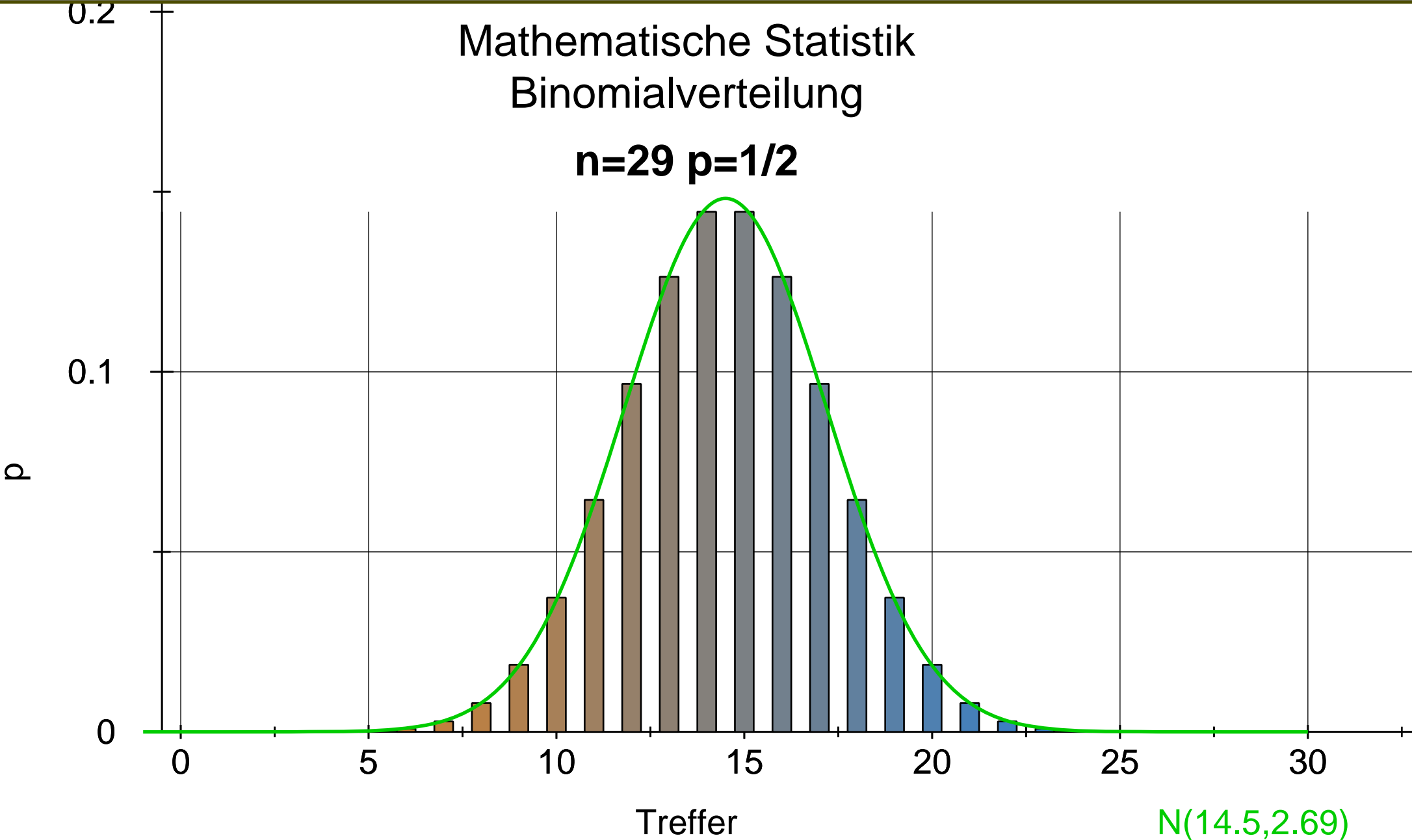
Mathematische Statistik
Binomialverteilung

n=28 p=1/2



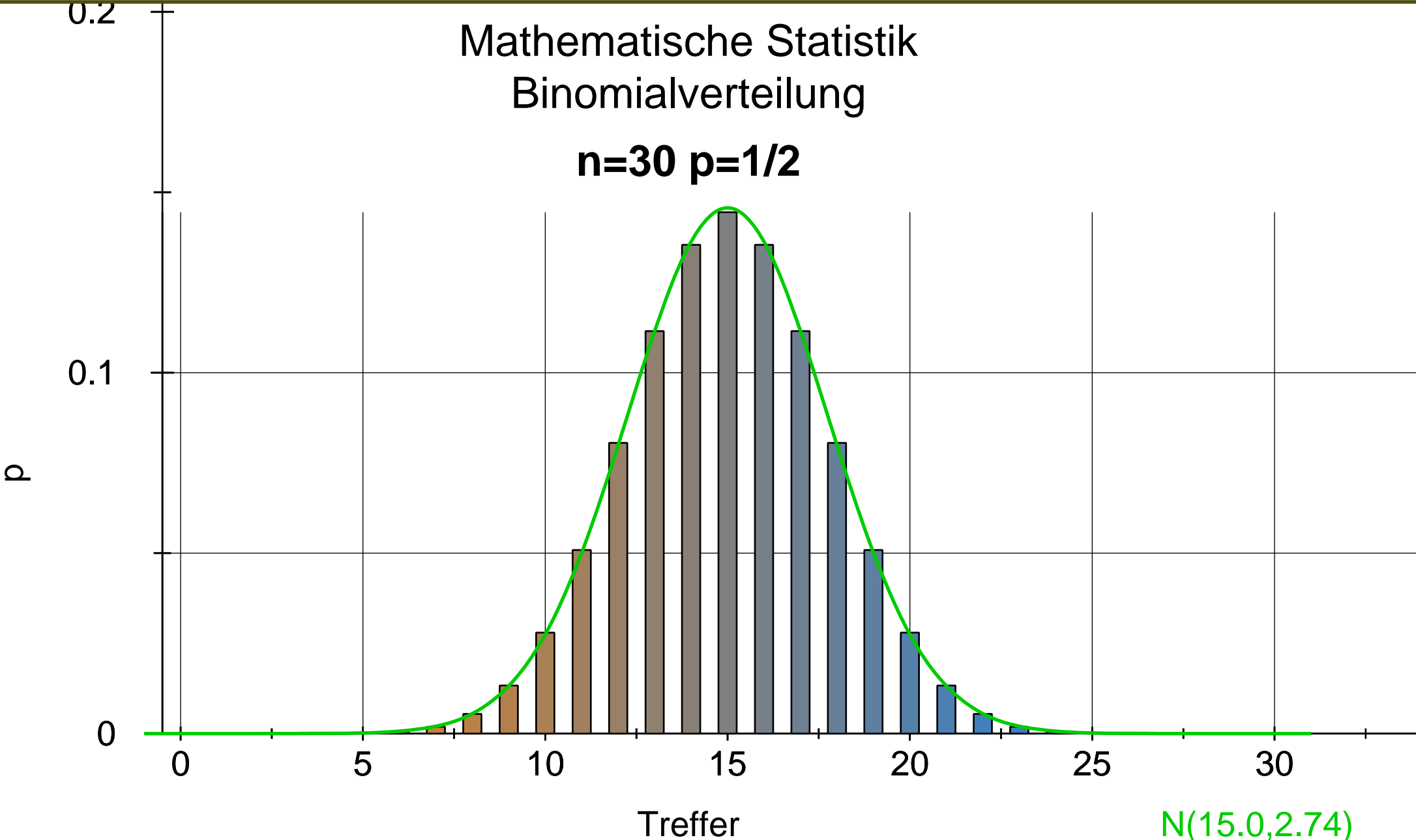
Mathematische Statistik
Binomialverteilung

n=29 p=1/2



Mathematische Statistik
Binomialverteilung

n=30 p=1/2



Mathematische Statistik

Binomialverteilung

n=31 p=1/2

p

0.1

0

0

5

10

15

20

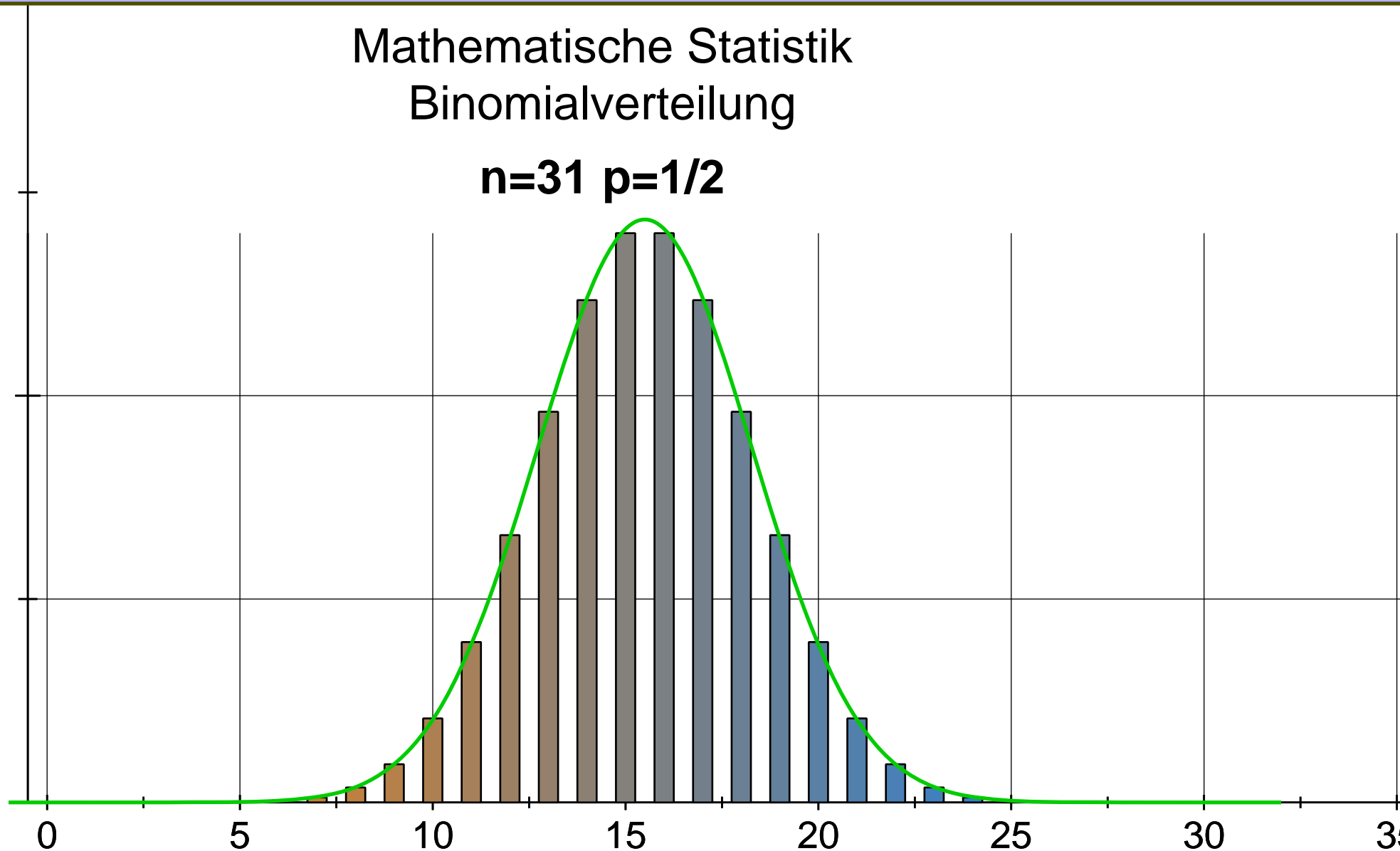
25

30

35

Treffer

$N(15.5, 2.78)$



Mathematische Statistik

Binomialverteilung

n=32 p=1/2

p

0.1

0

0

5

10

15

20

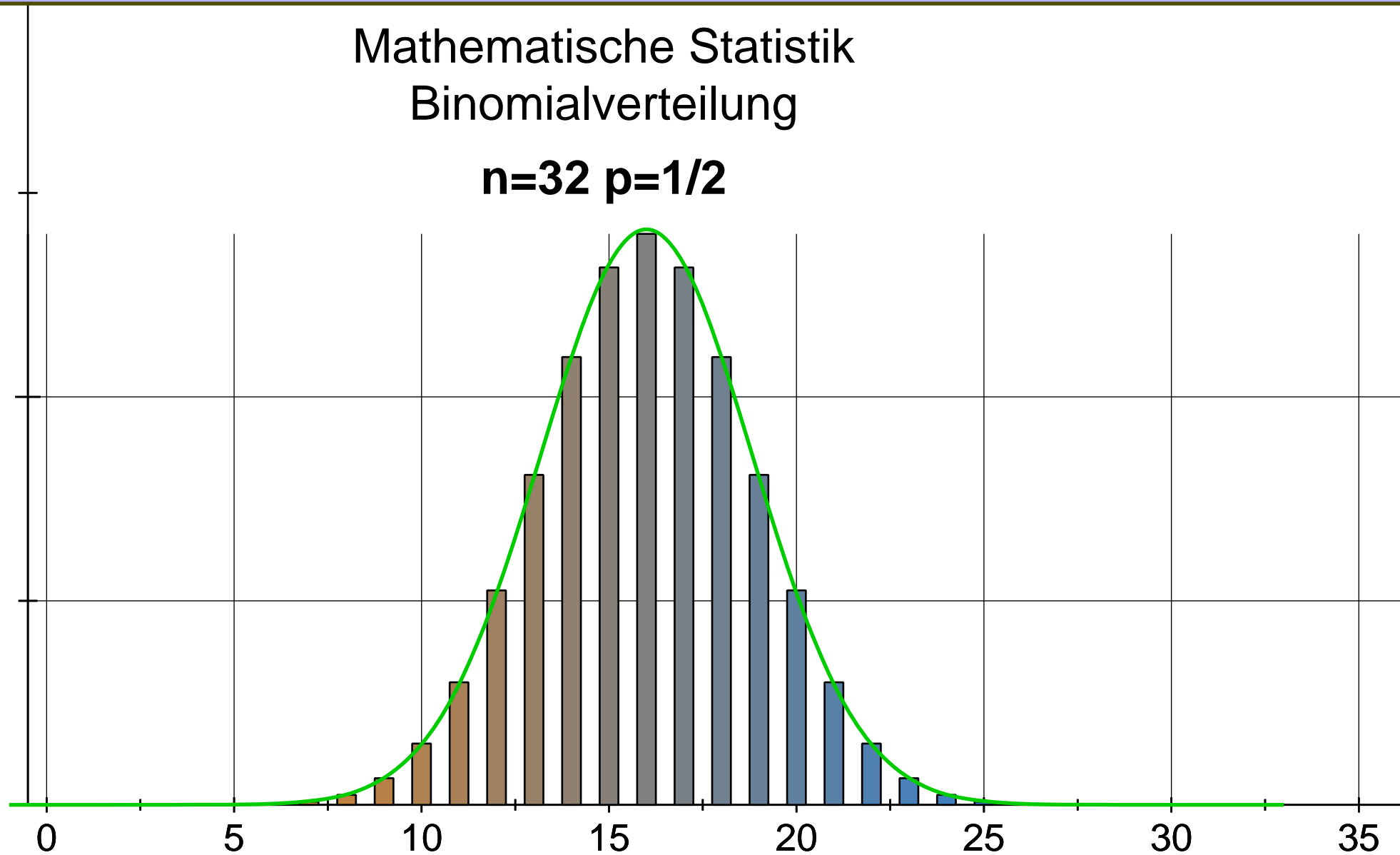
25

30

35

Treffer

$N(16.0, 2.83)$



Mathematische Statistik

Binomialverteilung

$n=33$ $p=1/2$

p

0.1

0

0

5

10

15

20

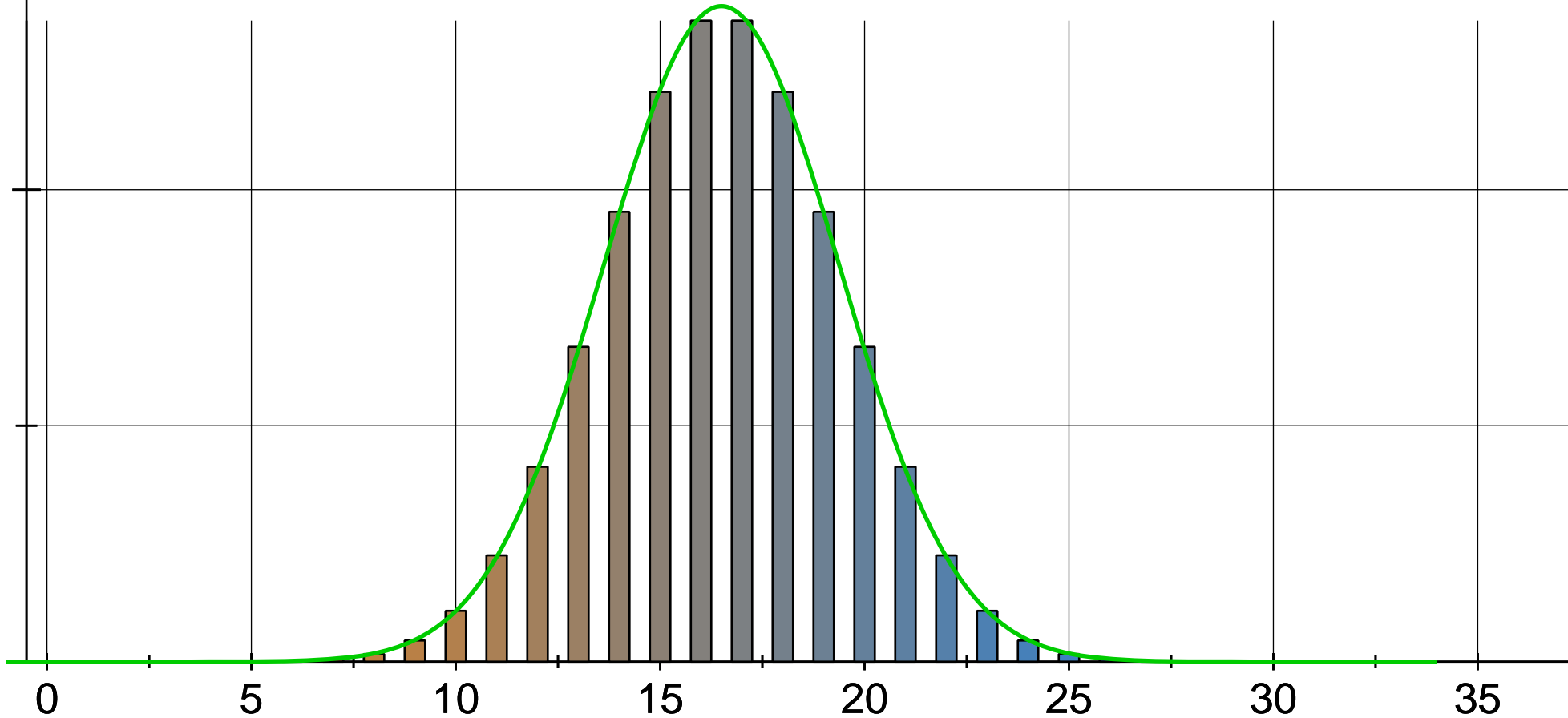
25

30

35

Treffer

$N(16.5, 2.87)$



Mathematische Statistik

Binomialverteilung

n=34 p=1/2

p

0.1

0

0

5

10

15

20

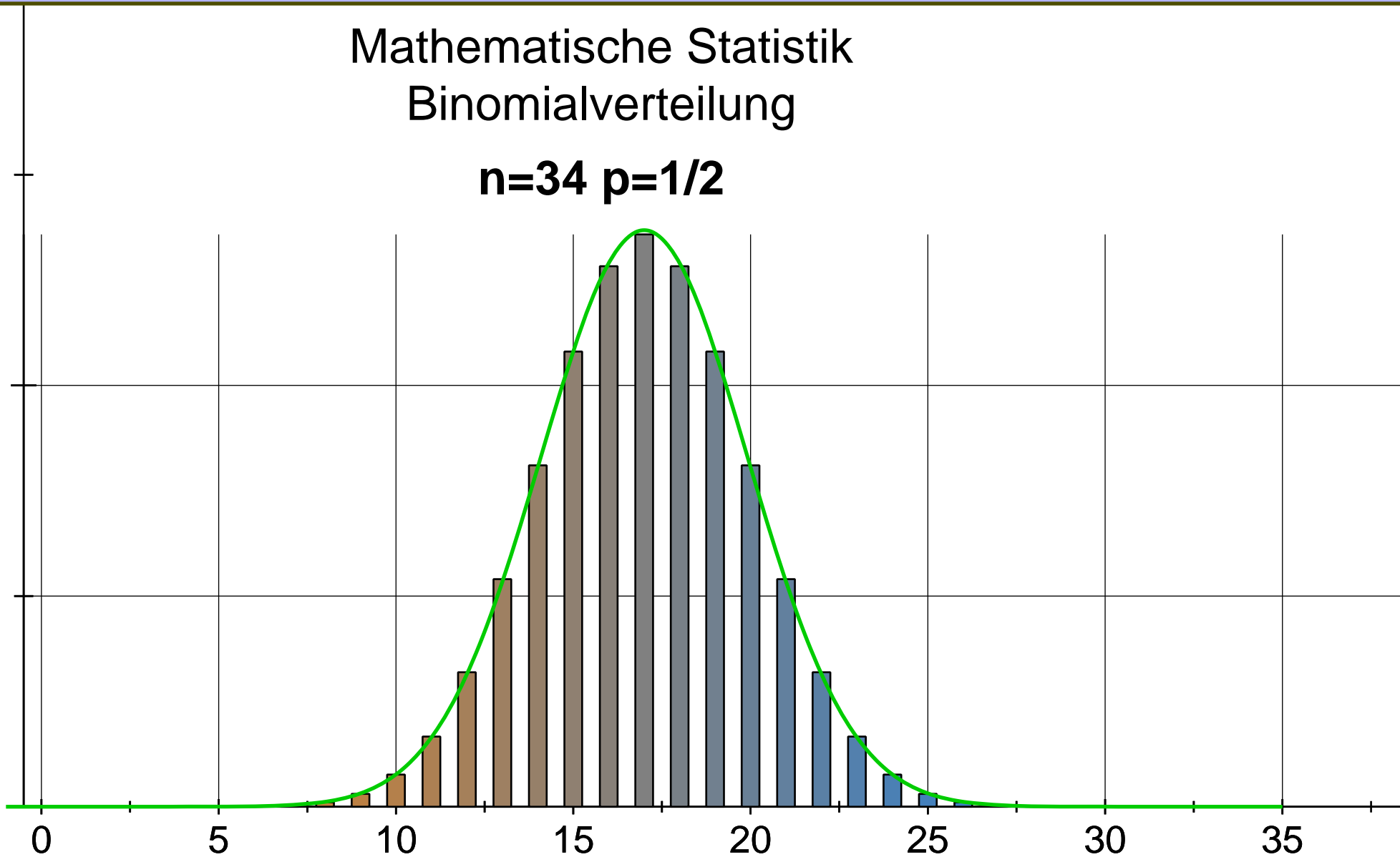
25

30

35

Treffer

$N(17.0, 2.92)$



Mathematische Statistik

Binomialverteilung

n=35 p=1/2

p

0.1

0

0

5

10

15

20

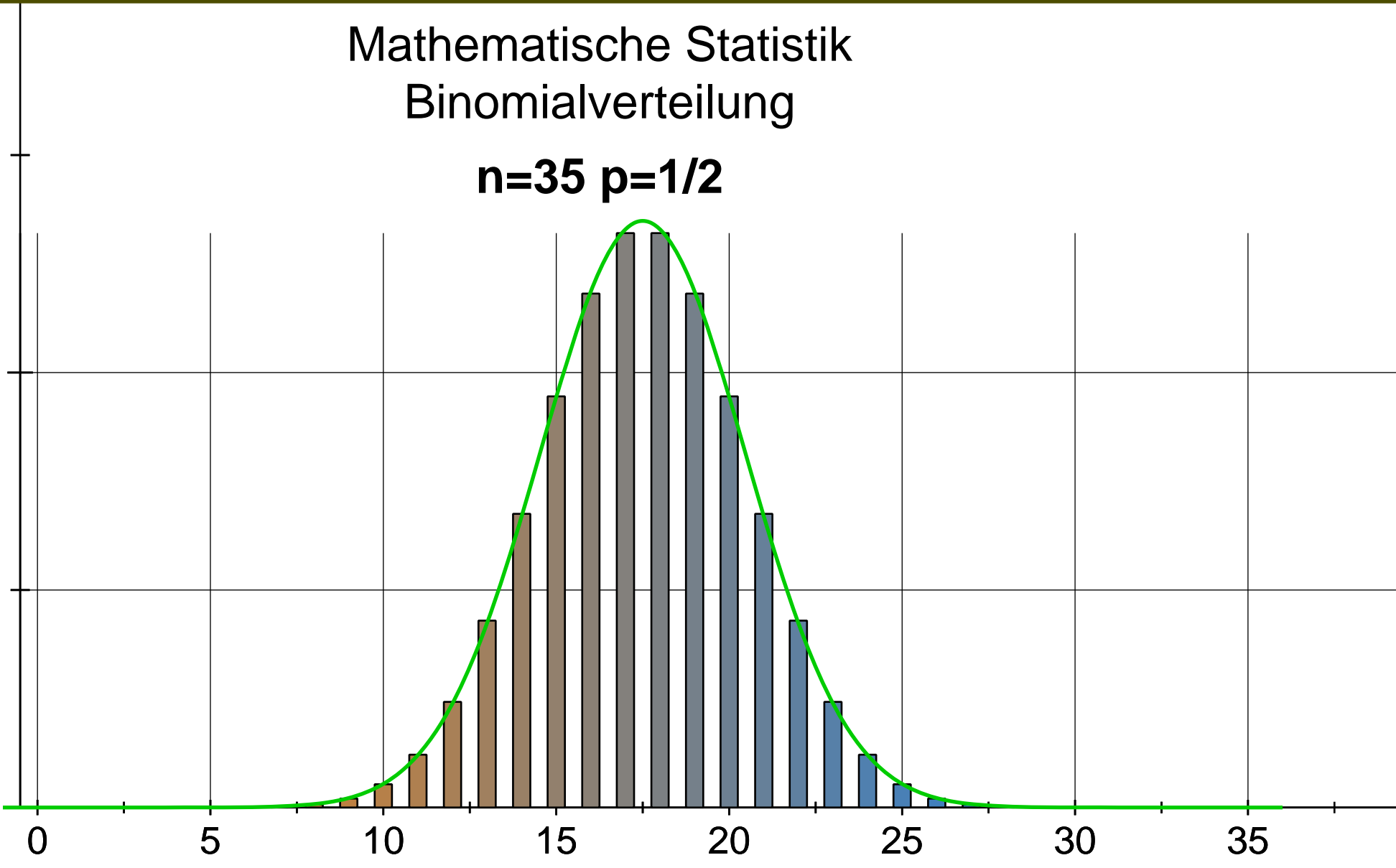
25

30

35

Treffer

$N(17.5, 2.96)$



Mathematische Statistik

Binomialverteilung

n=36 p=1/2

p

0.1

0

0

5

10

15

20

25

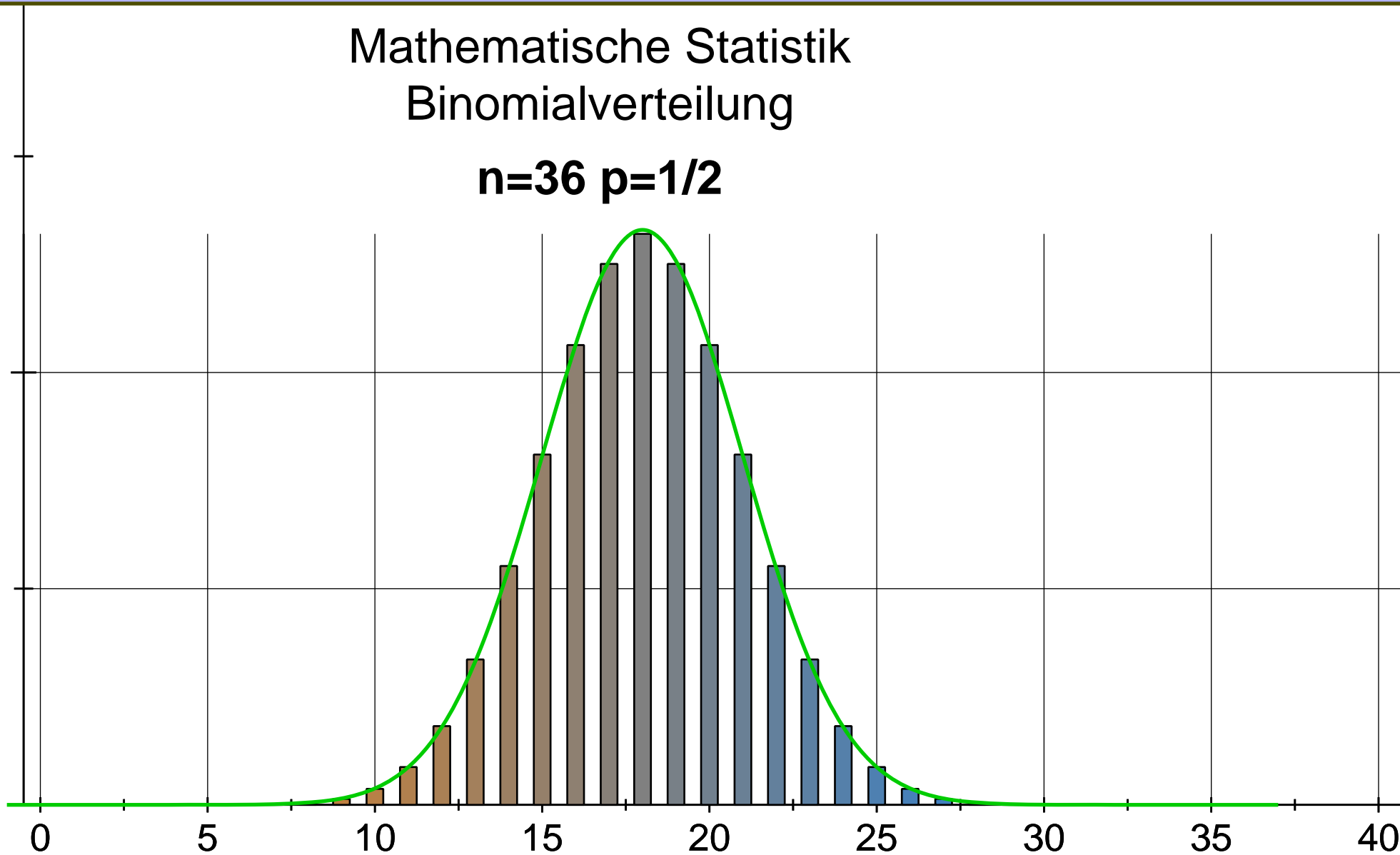
30

35

40

Treffer

$N(18.0, 3.00)$



Mathematische Statistik

Binomialverteilung

$n=37$ $p=1/2$

p

0.1

0

0

5

10

15

20

25

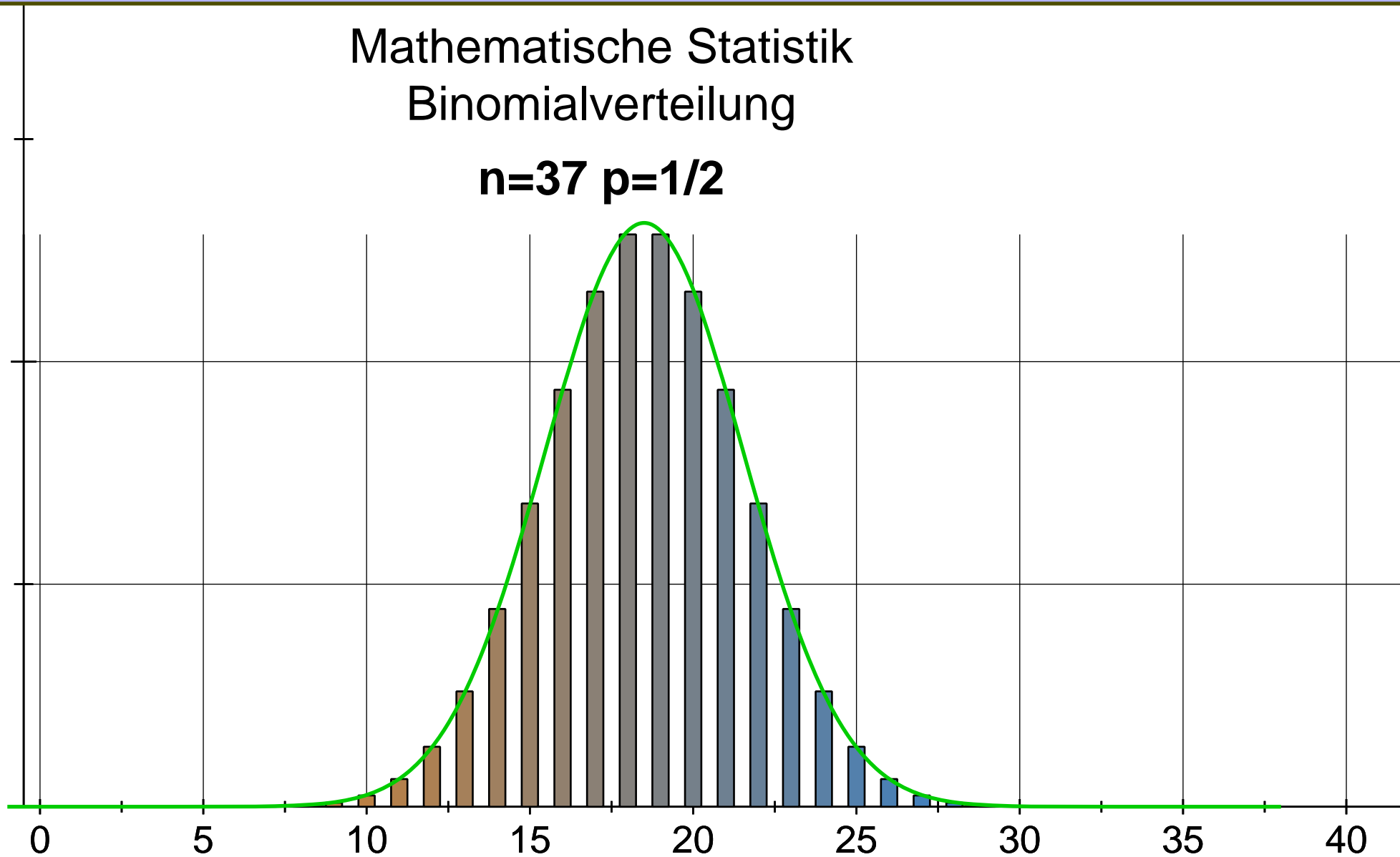
30

35

40

Treffer

$N(18.5, 3.04)$



Mathematische Statistik

Binomialverteilung

n=38 p=1/2

p

0.1

0

0

5

10

15

20

25

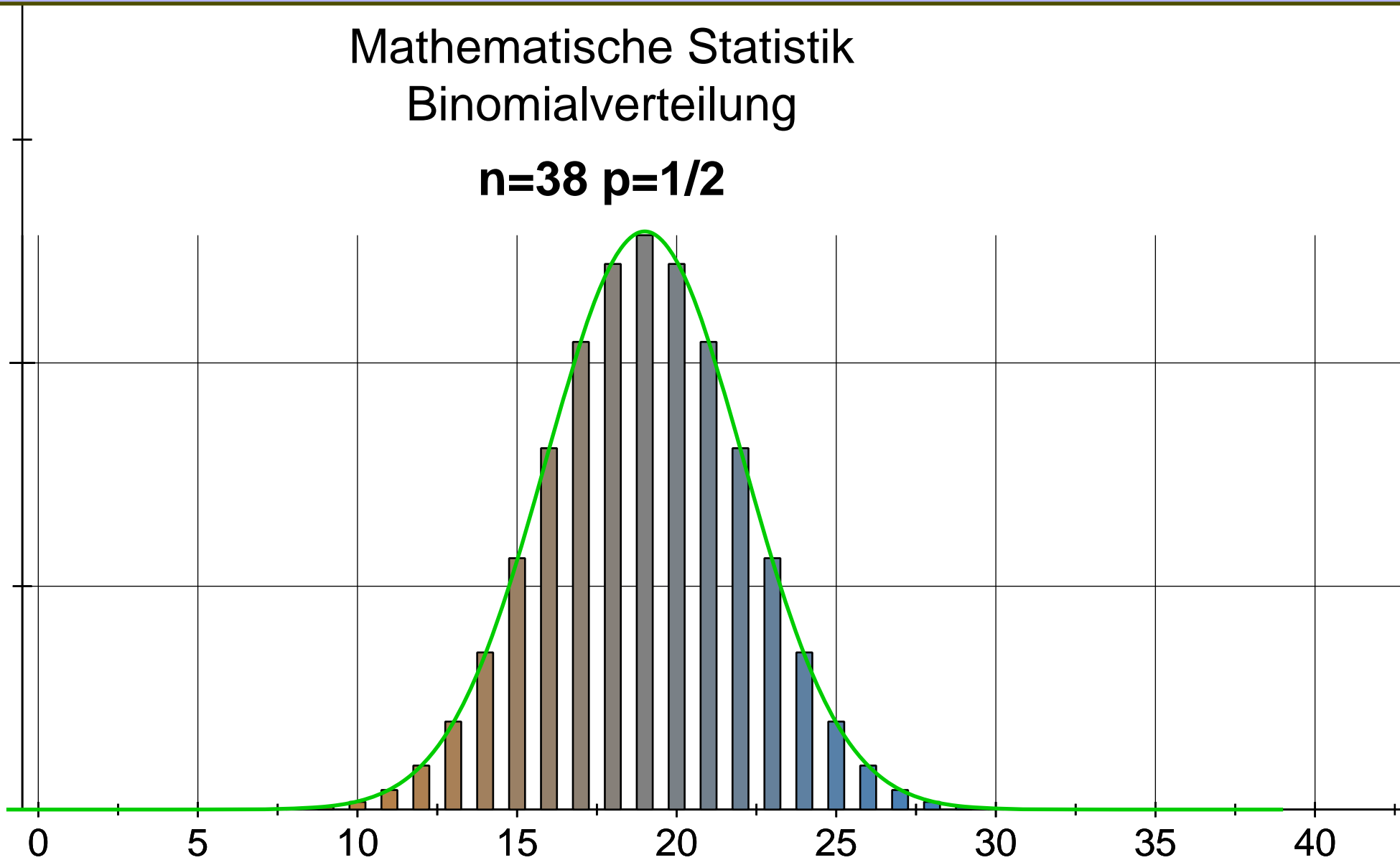
30

35

40

Treffer

$N(19.0, 3.08)$



Mathematische Statistik

Binomialverteilung

n=39 p=1/2

p

0.1

0

0

5

10

15

20

25

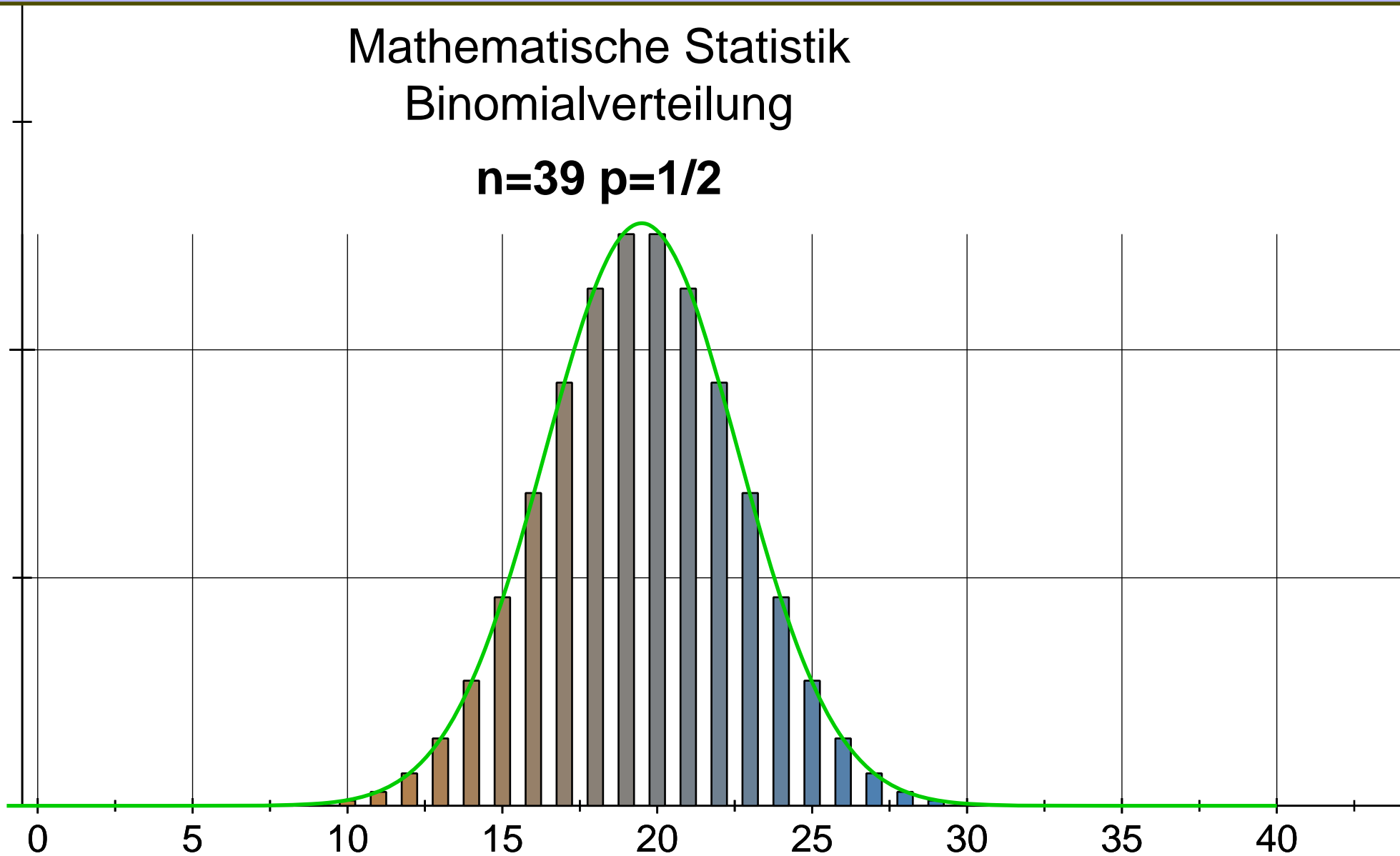
30

35

40

Treffer

$N(19.5, 3.12)$



Mathematische Statistik

Binomialverteilung

n=40 p=1/2

p

0.1

0

0

5

10

15

20

25

30

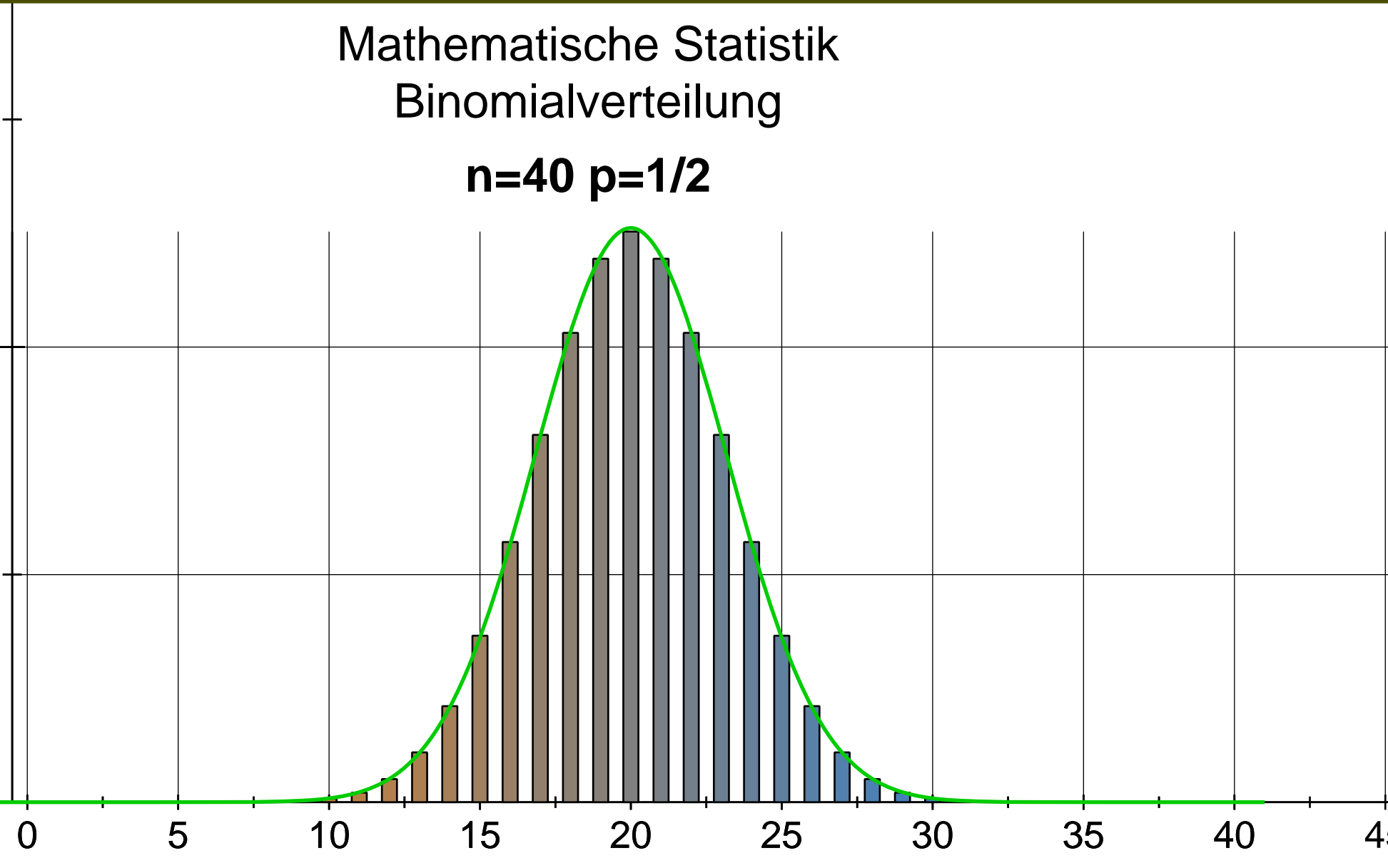
35

40

4

Treffer

$N(20.0,3.16)$



Mathematische Statistik

Binomialverteilung

n=41 p=1/2

p

0.1

0

0

5

10

15

20

25

30

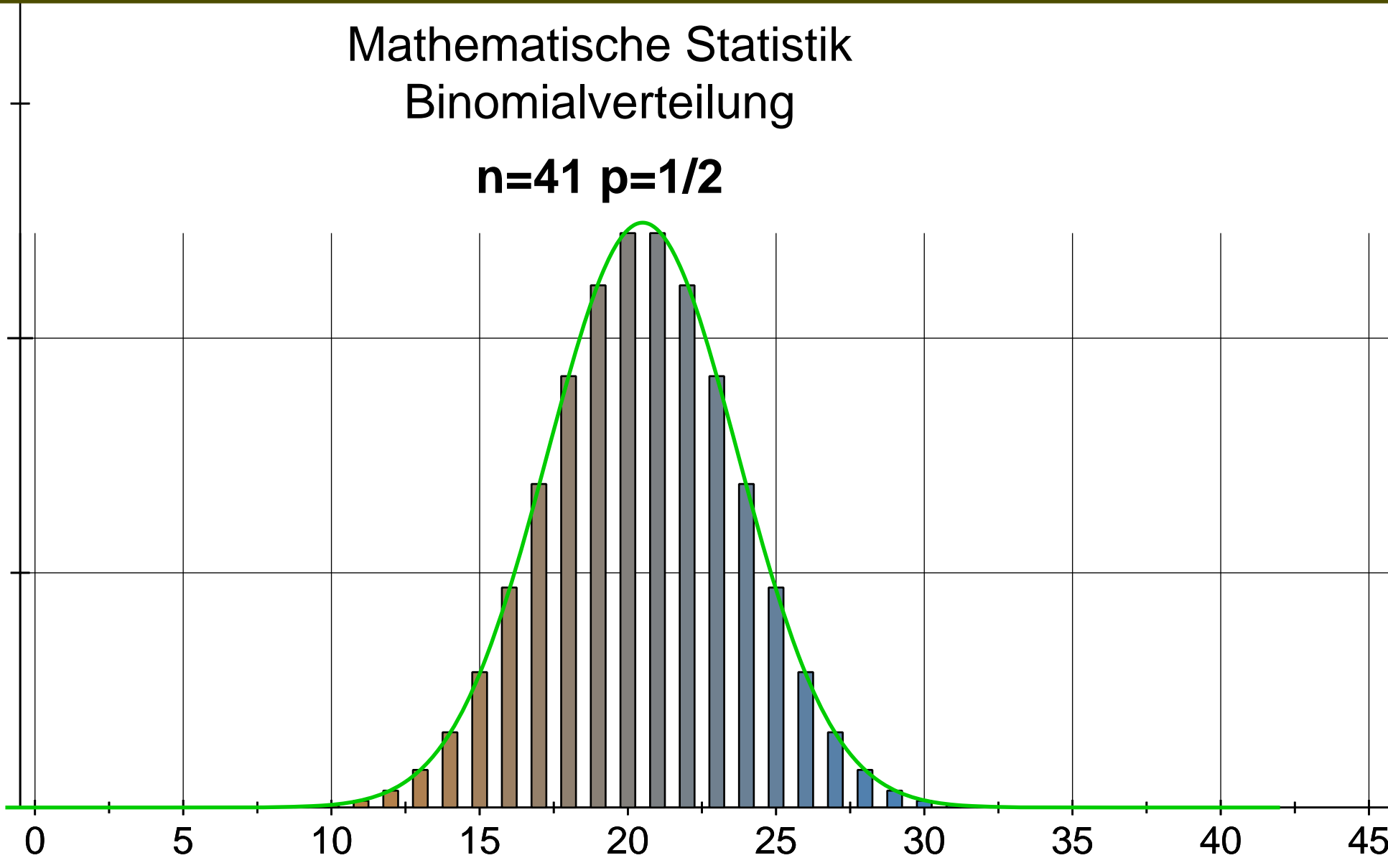
35

40

45

Treffer

$N(20.5, 3.20)$



Mathematische Statistik

Binomialverteilung

n=42 p=1/2

p

0.1

0

0

5

10

15

20

25

30

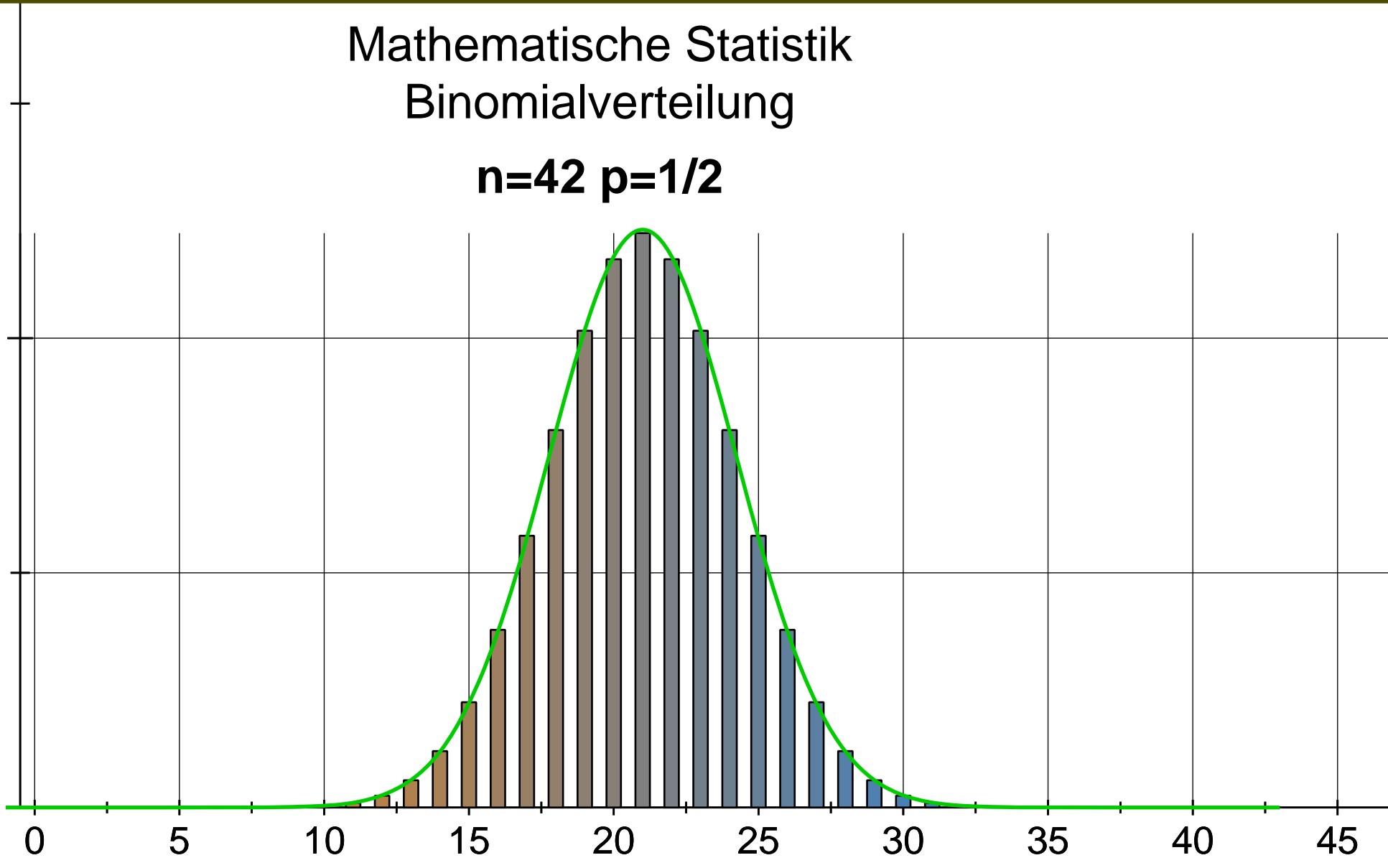
35

40

45

Treffer

$N(21.0, 3.24)$



Mathematische Statistik

Binomialverteilung

n=43 p=1/2

p

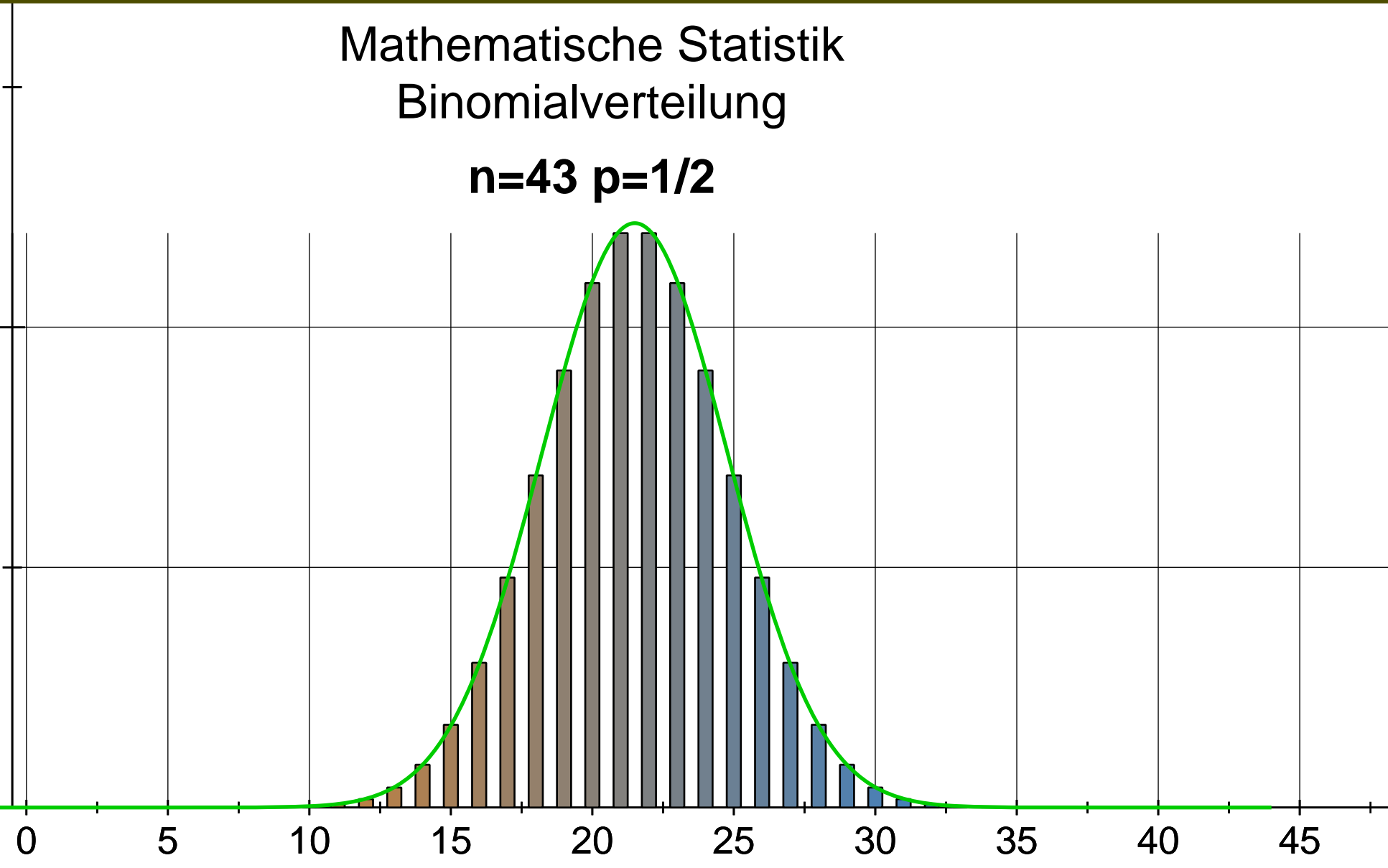
0.1

0

0 5 10 15 20 25 30 35 40 45

Treffer

$N(21.5, 3.28)$



Mathematische Statistik

Binomialverteilung

n=44 p=1/2

p

0.1

0

0

5

10

15

20

25

30

35

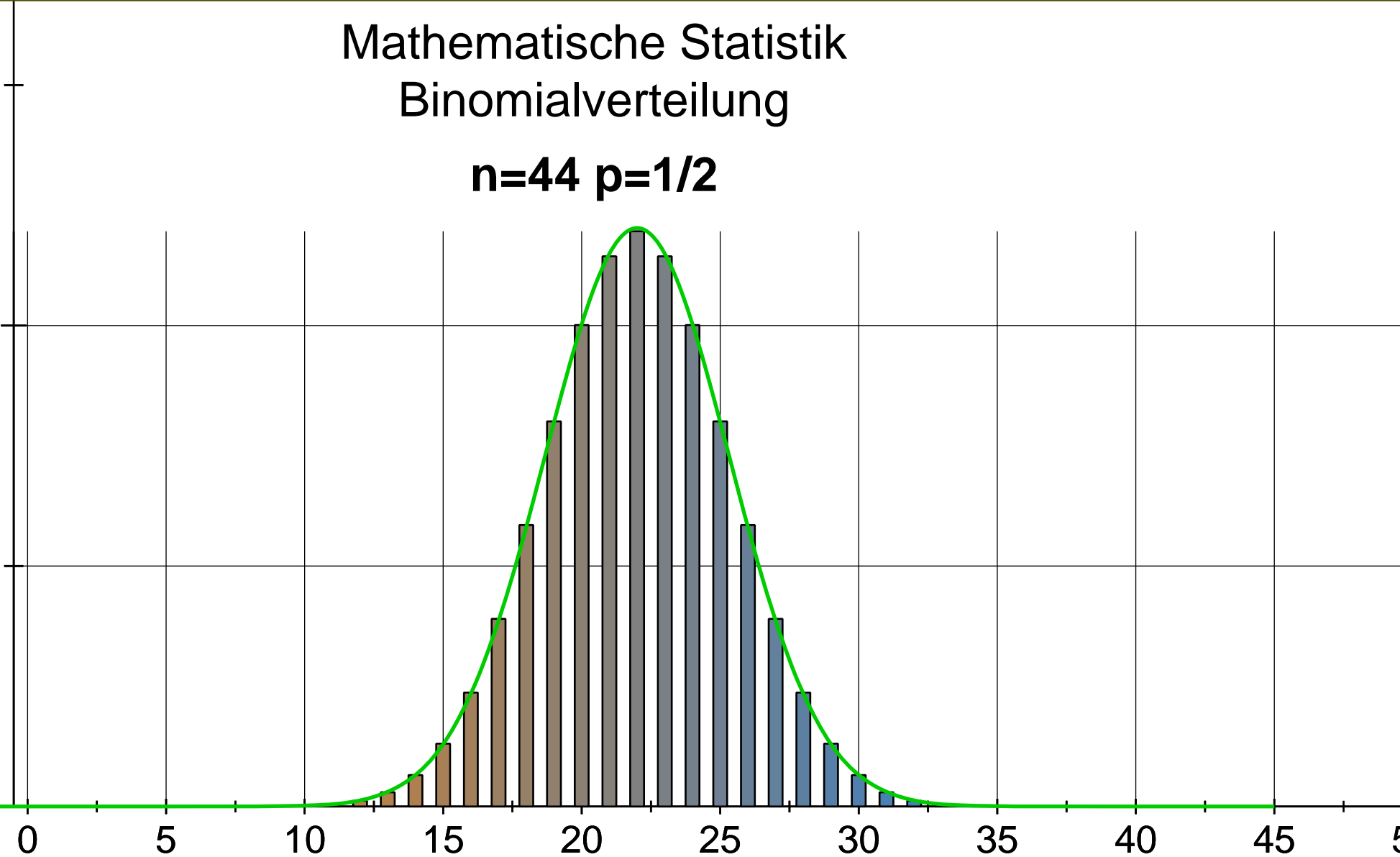
40

45

50

Treffer

$N(22.0, 3.32)$



Mathematische Statistik

Binomialverteilung

n=45 p=1/2

p

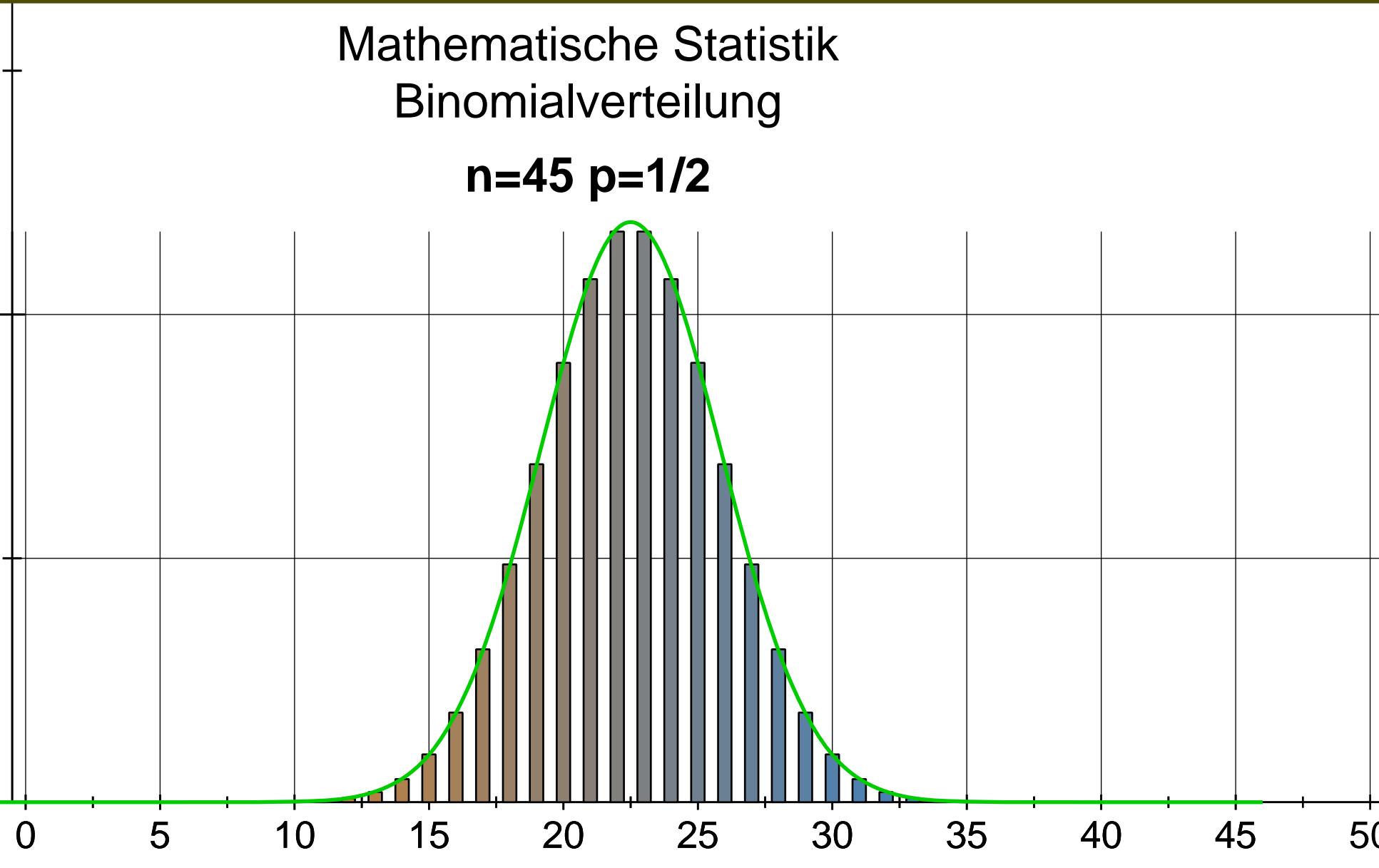
0.1

0

0 5 10 15 20 25 30 35 40 45 50

Treffer

$N(22.5, 3.35)$



Mathematische Statistik

Binomialverteilung

n=46 p=1/2

p

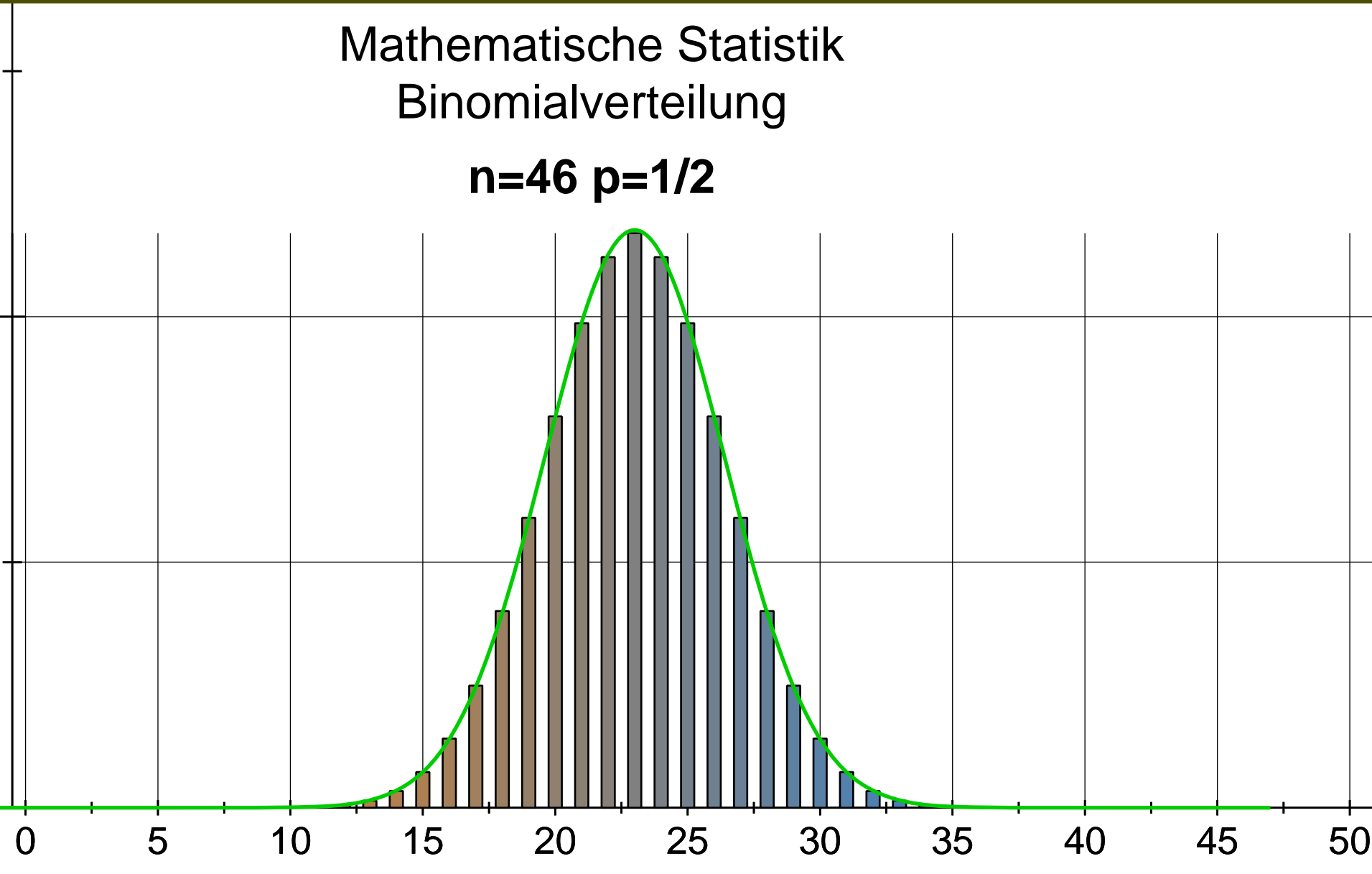
0.1

0

0 5 10 15 20 25 30 35 40 45 50

Treffer

$N(23.0, 3.39)$



Mathematische Statistik

Binomialverteilung

n=47 p=1/2

p

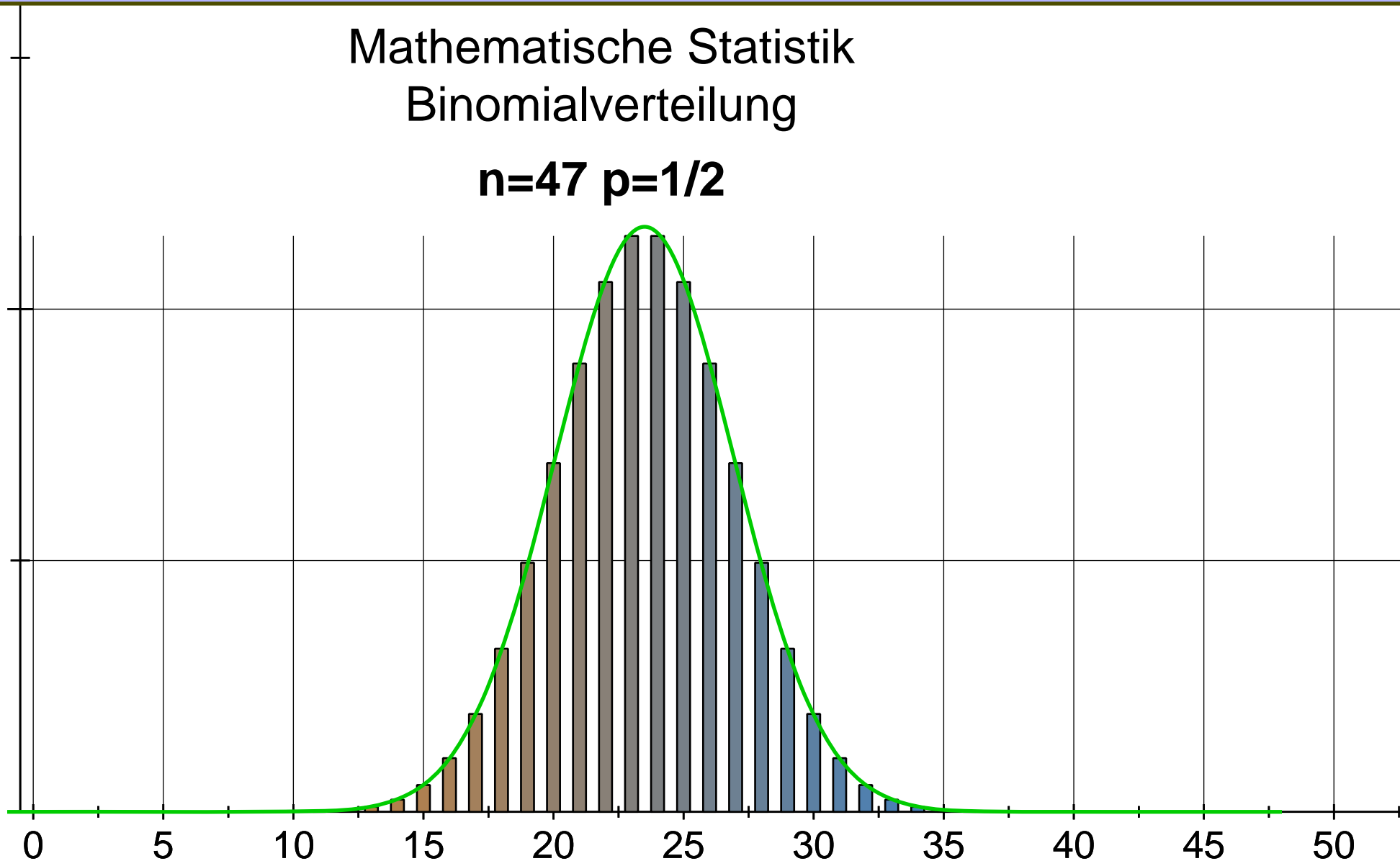
0.1

0

0 5 10 15 20 25 30 35 40 45 50

Treffer

$N(23.5, 3.43)$



Mathematische Statistik

Binomialverteilung

n=48 p=1/2

p

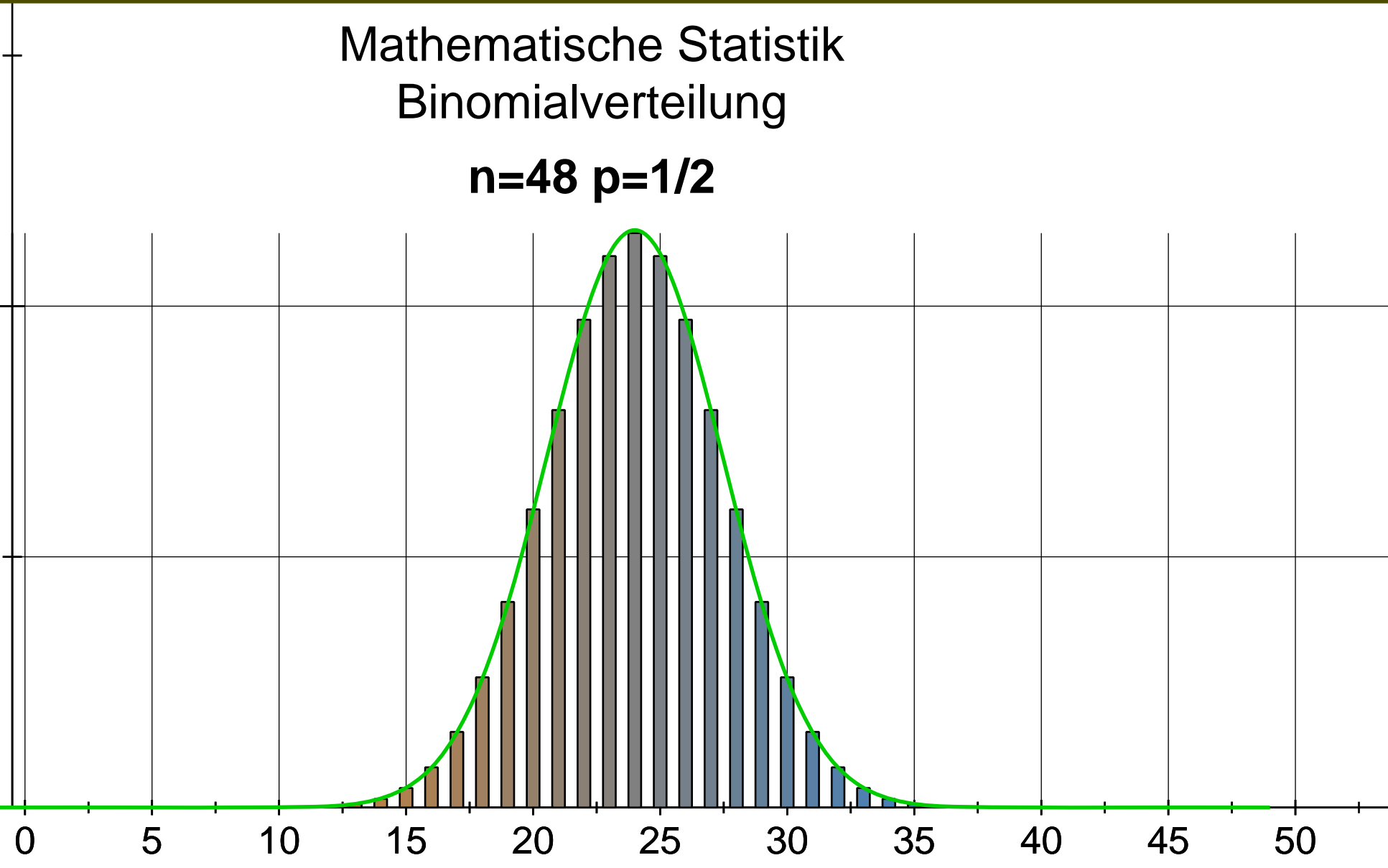
0.1

0

0 5 10 15 20 25 30 35 40 45 50

Treffer

$N(24.0, 3.46)$



Mathematische Statistik

Binomialverteilung

n=49 p=1/2

p

0.1

0

0

5

10

15

20

25

30

35

40

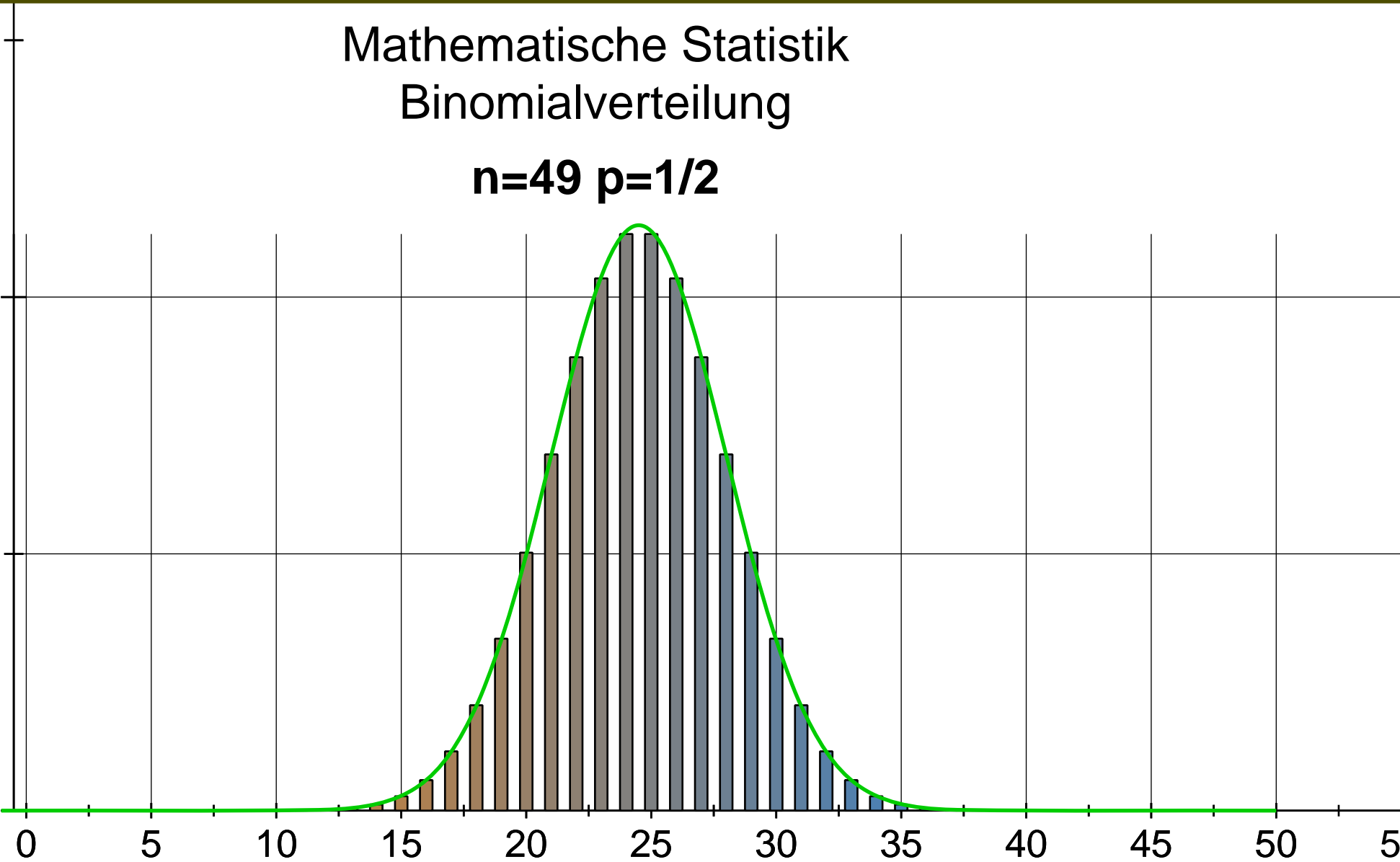
45

50

5

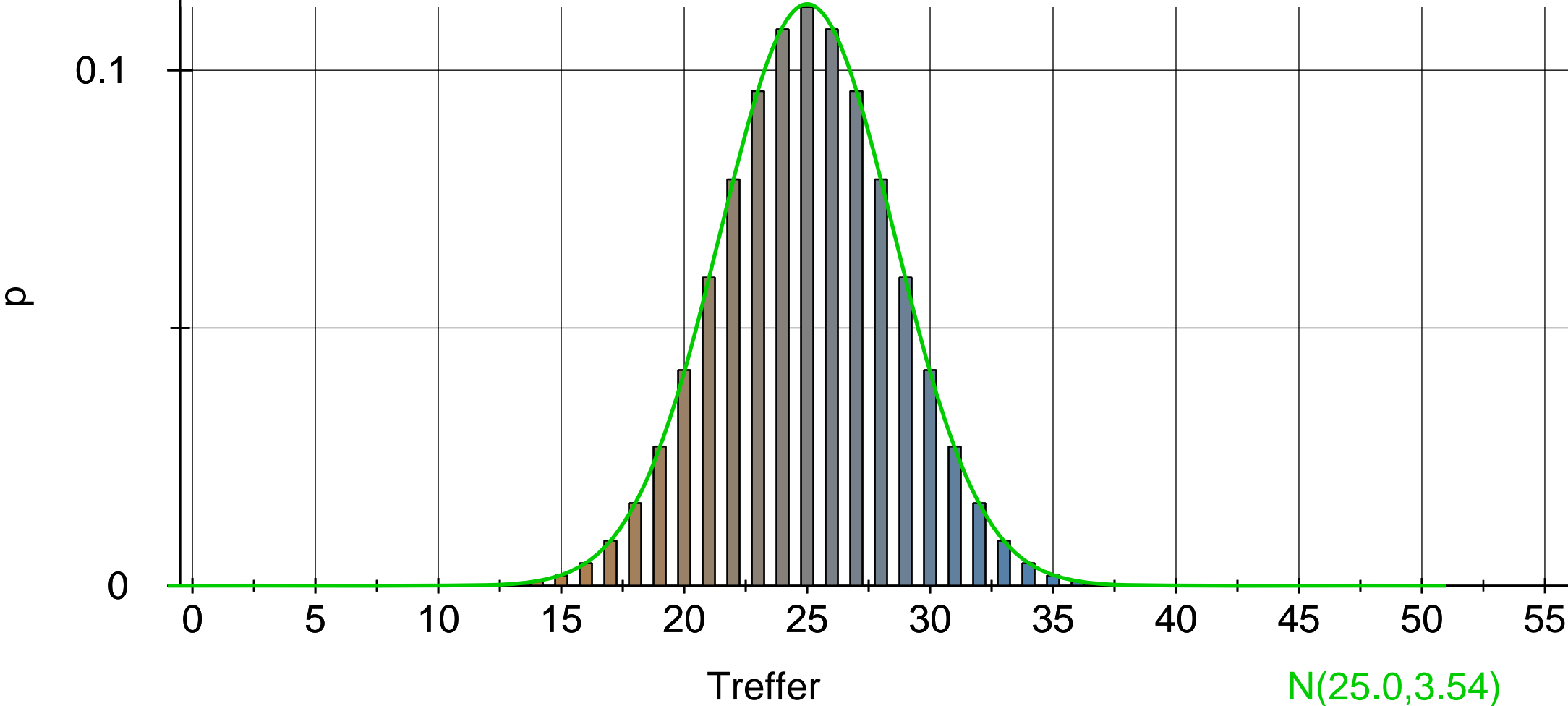
Treffer

$N(24.5, 3.50)$



Mathematische Statistik
Binomialverteilung

n=50 p=1/2



Mathematische Statistik

Binomialverteilung

n=51 p=1/2

p

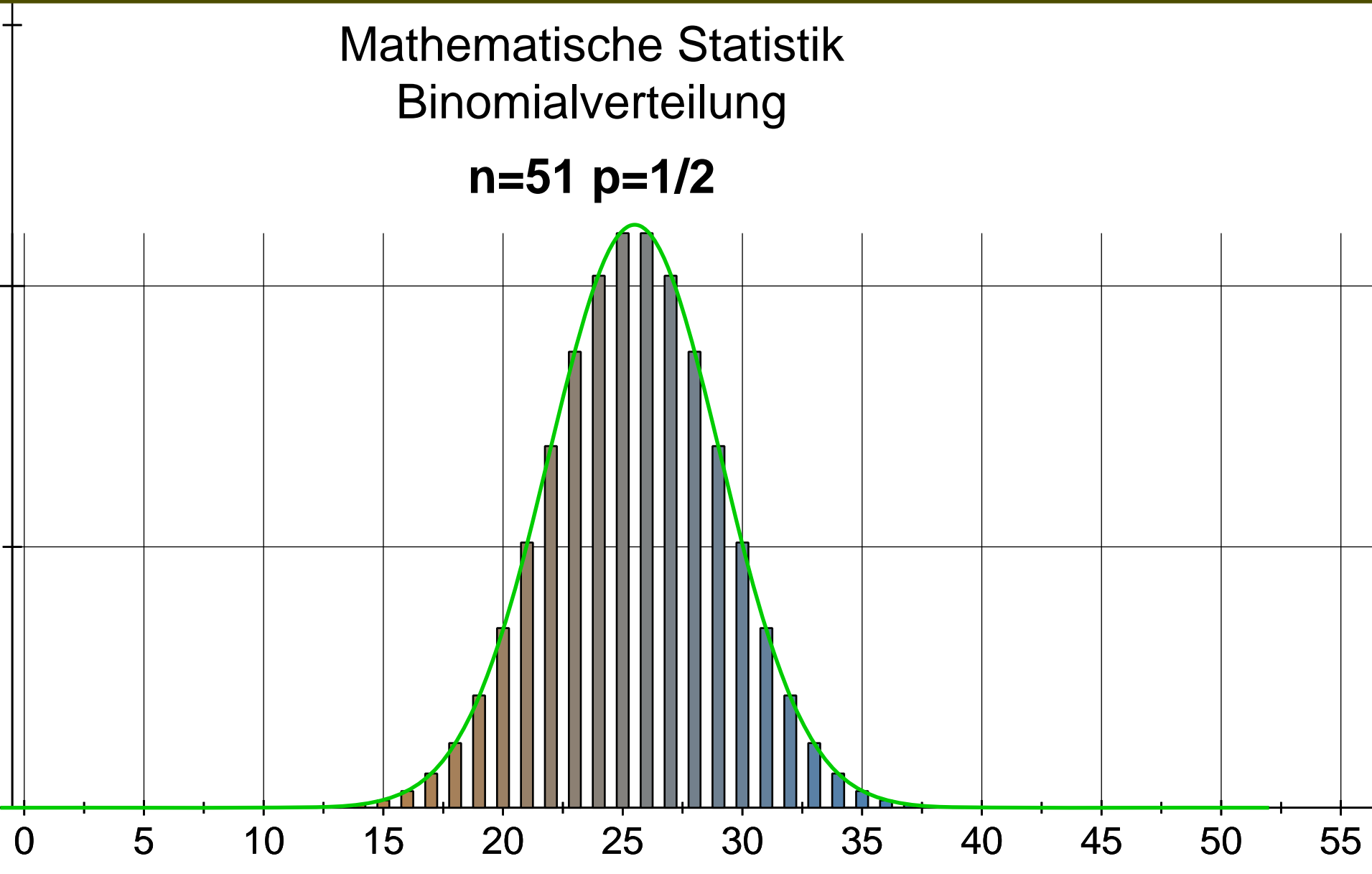
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55

Treffer

$N(25.5, 3.57)$



Mathematische Statistik

Binomialverteilung

$n=52$ $p=1/2$

p

0.1

0

0

5

10

15

20

25

30

35

40

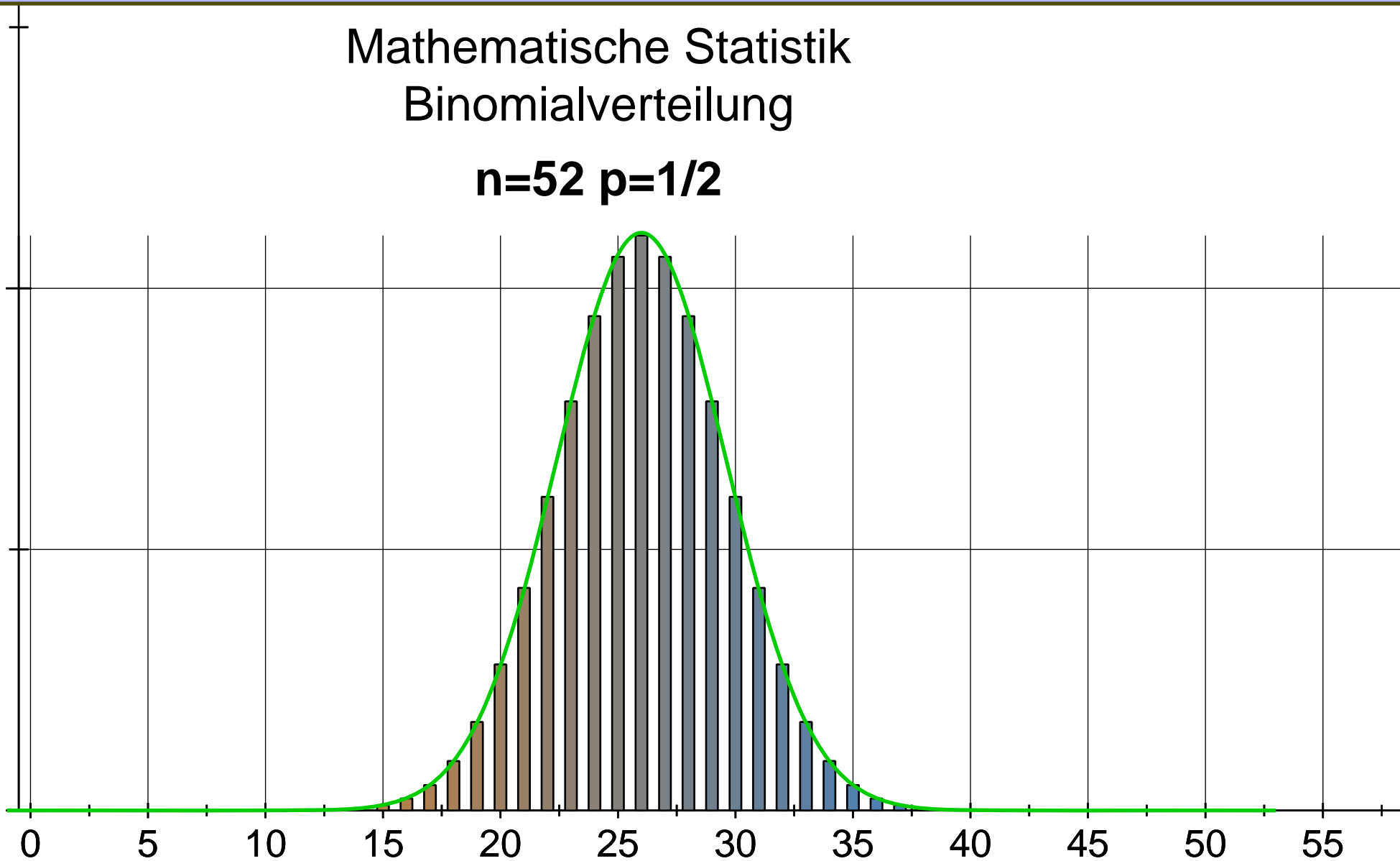
45

50

55

Treffer

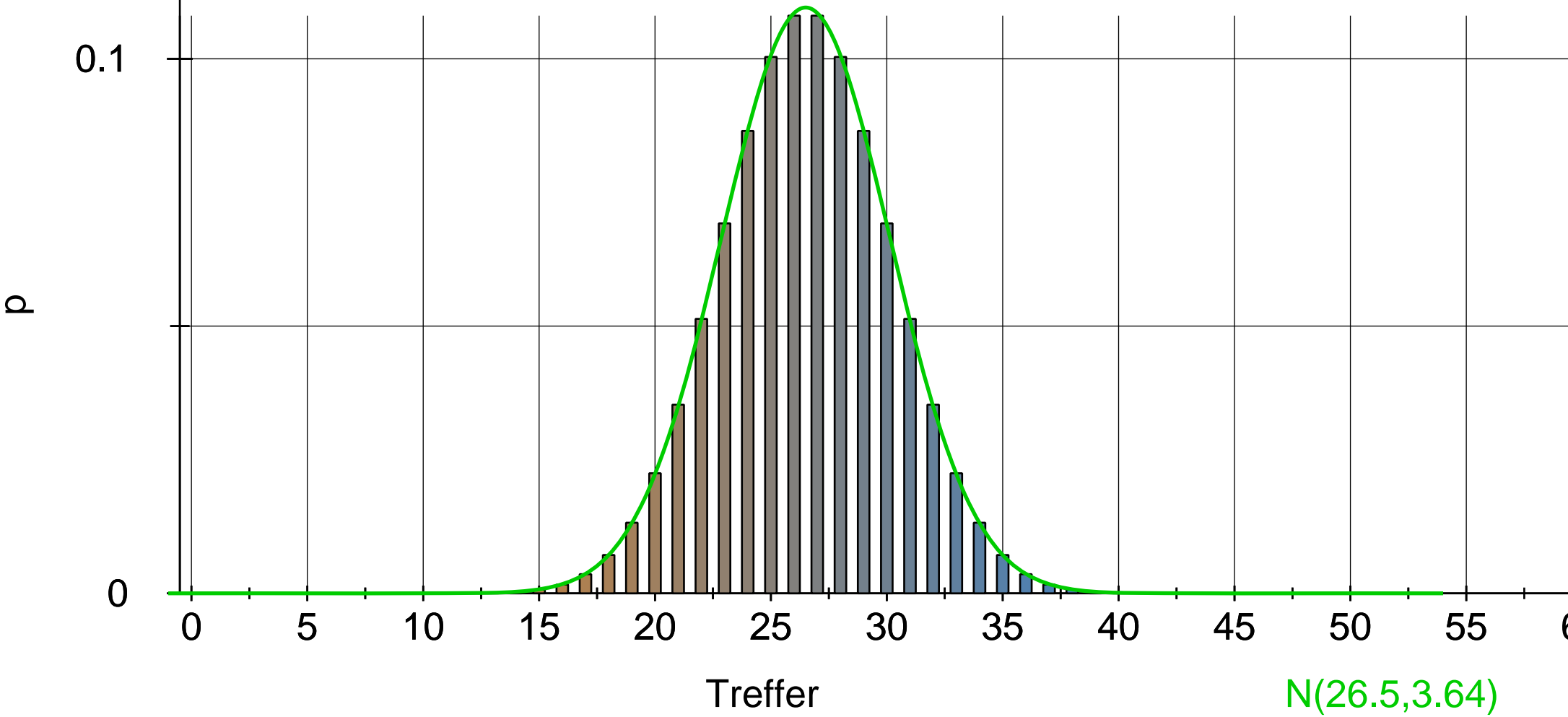
$N(26.0, 3.61)$



Mathematische Statistik

Binomialverteilung

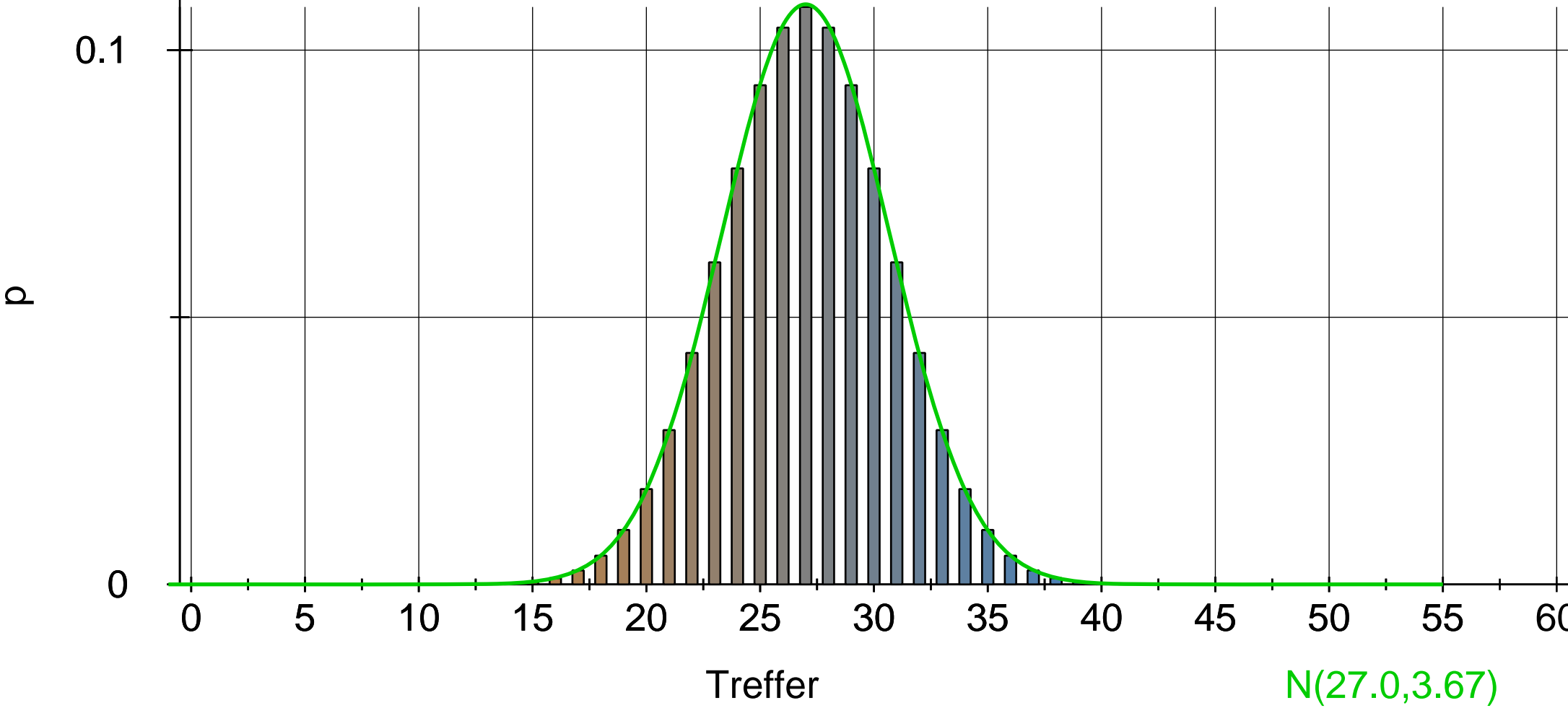
n=53 p=1/2



Mathematische Statistik

Binomialverteilung

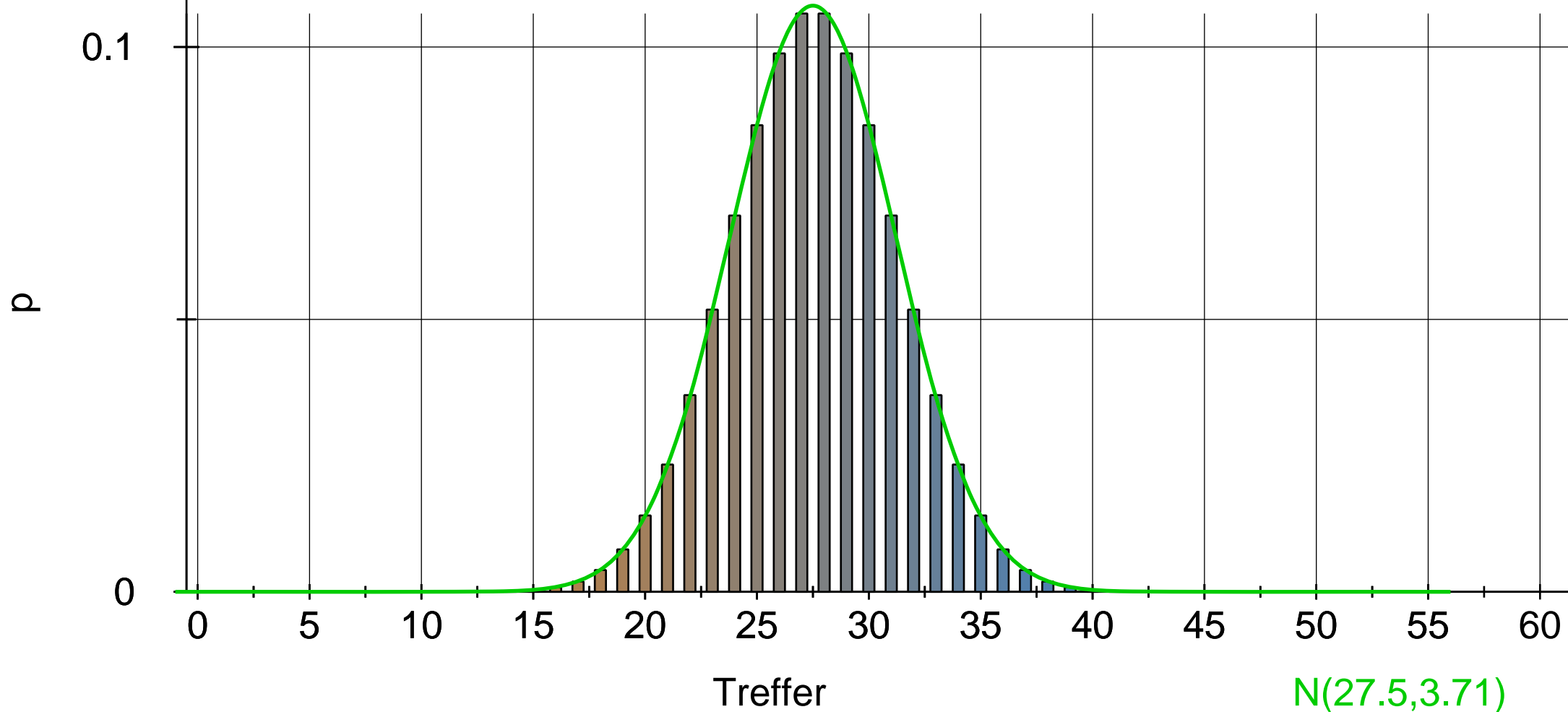
n=54 p=1/2



Mathematische Statistik

Binomialverteilung

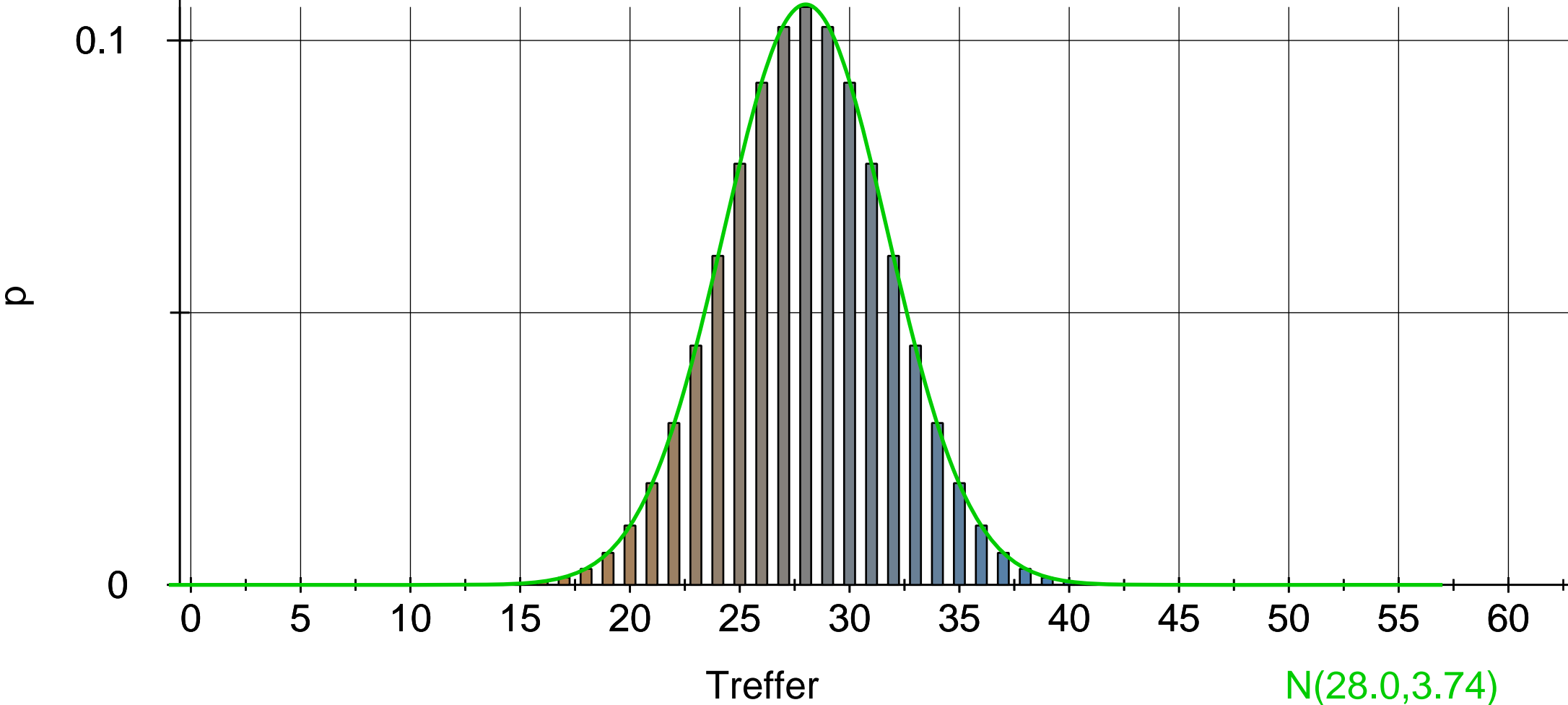
n=55 p=1/2



Mathematische Statistik

Binomialverteilung

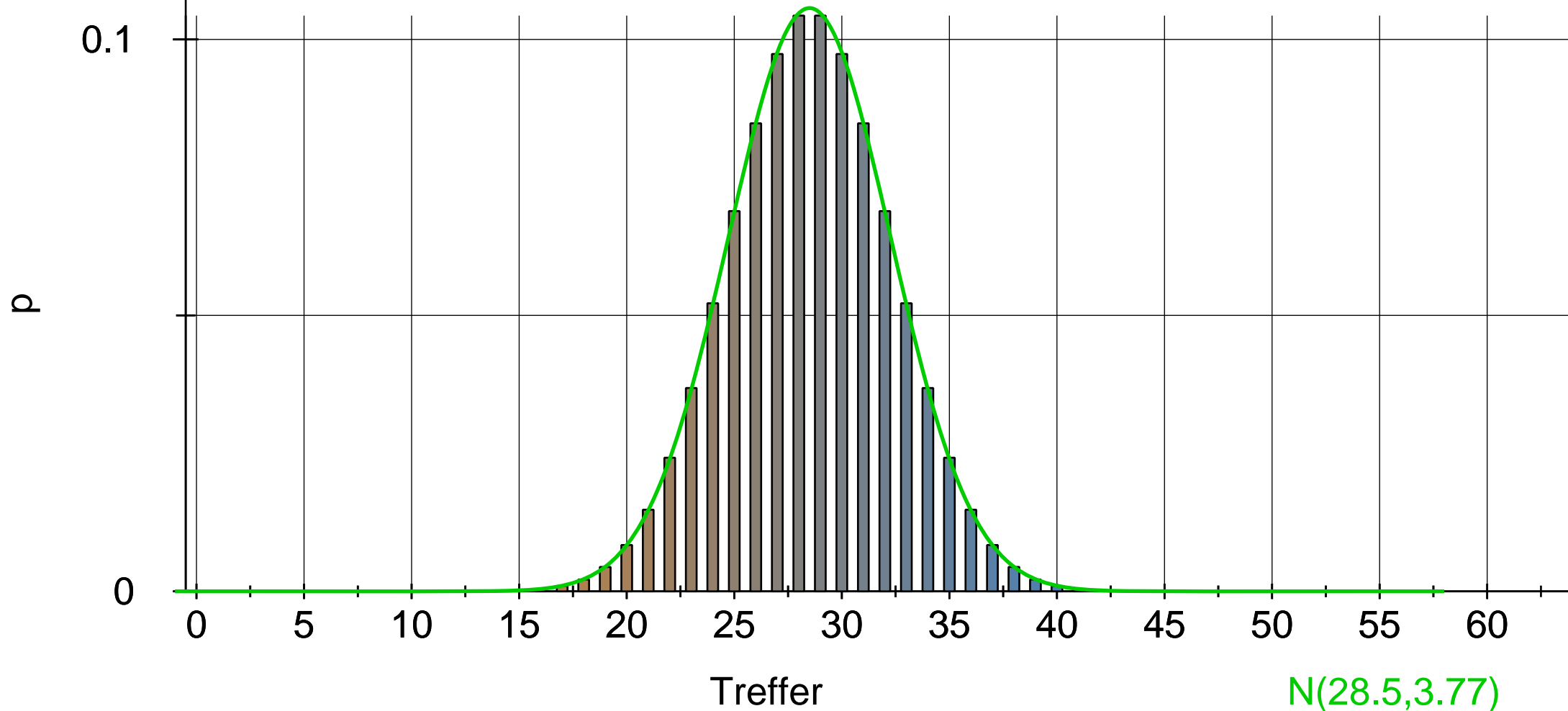
n=56 p=1/2



Mathematische Statistik

Binomialverteilung

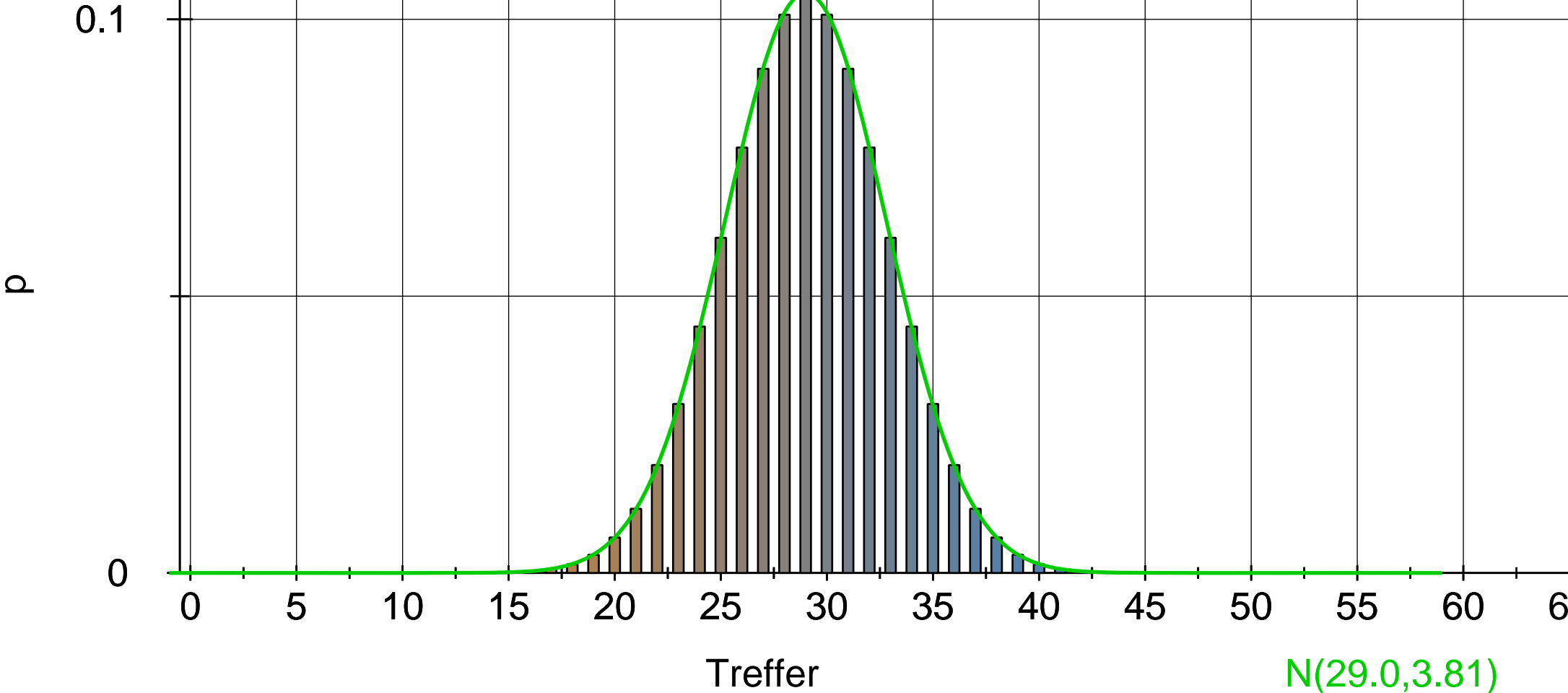
$n=57$ $p=1/2$



Mathematische Statistik

Binomialverteilung

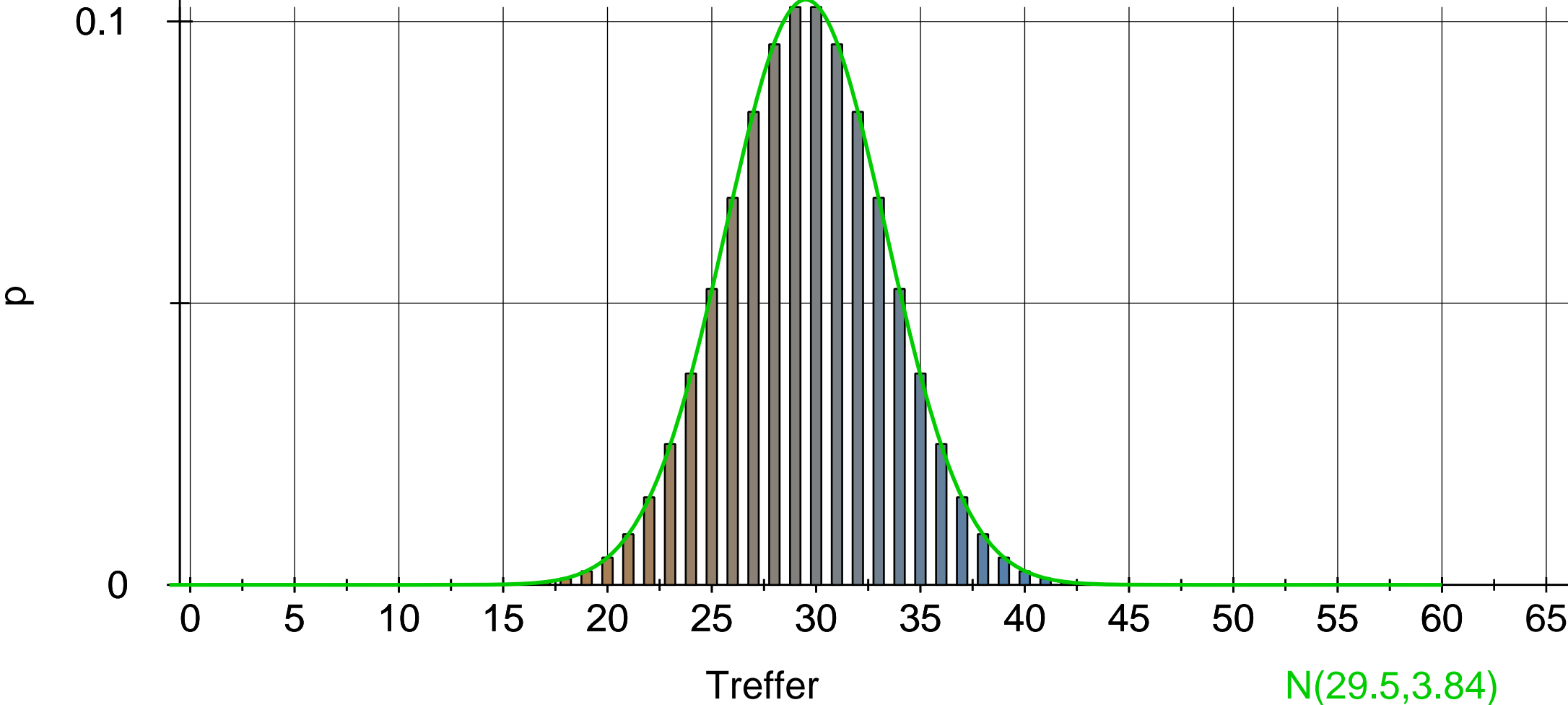
n=58 p=1/2



Mathematische Statistik

Binomialverteilung

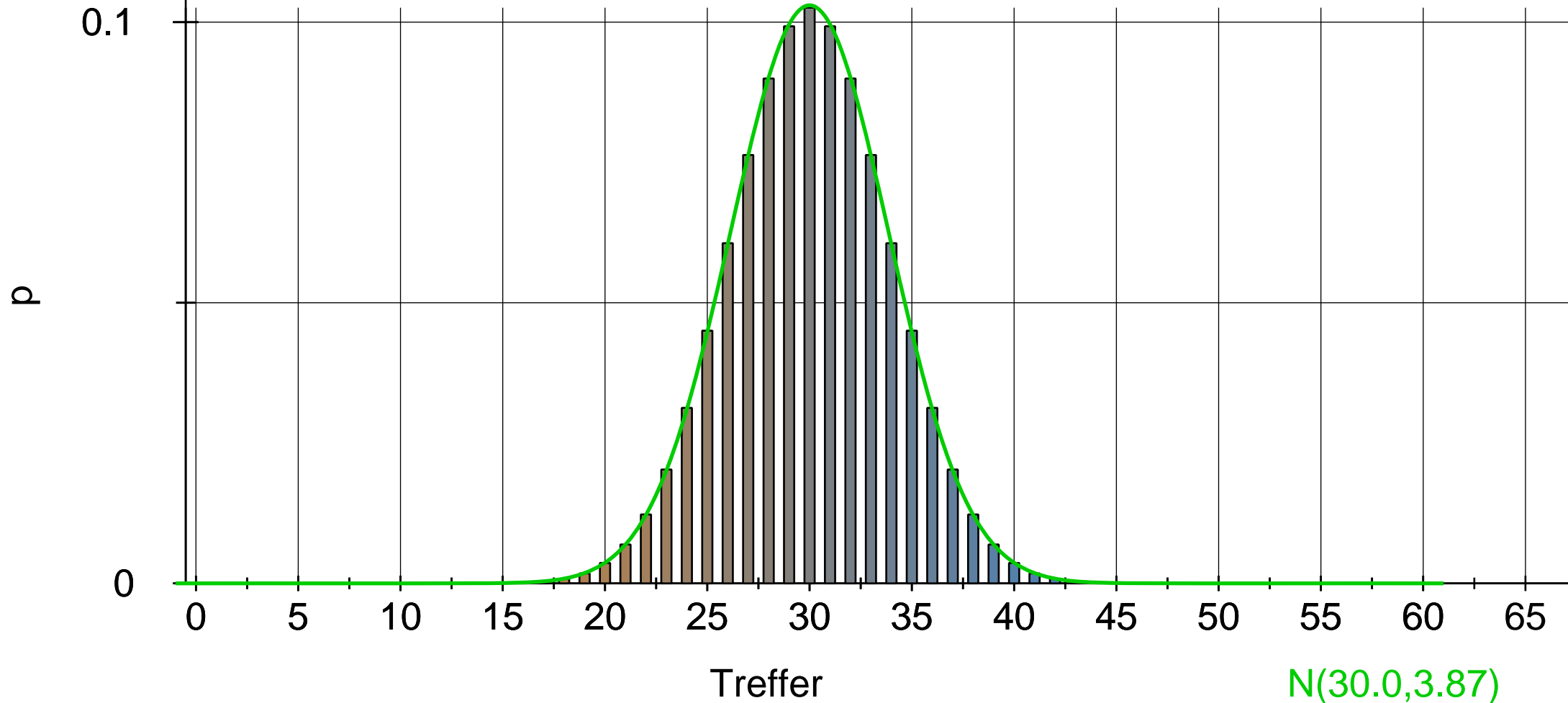
n=59 p=1/2



Mathematische Statistik

Binomialverteilung

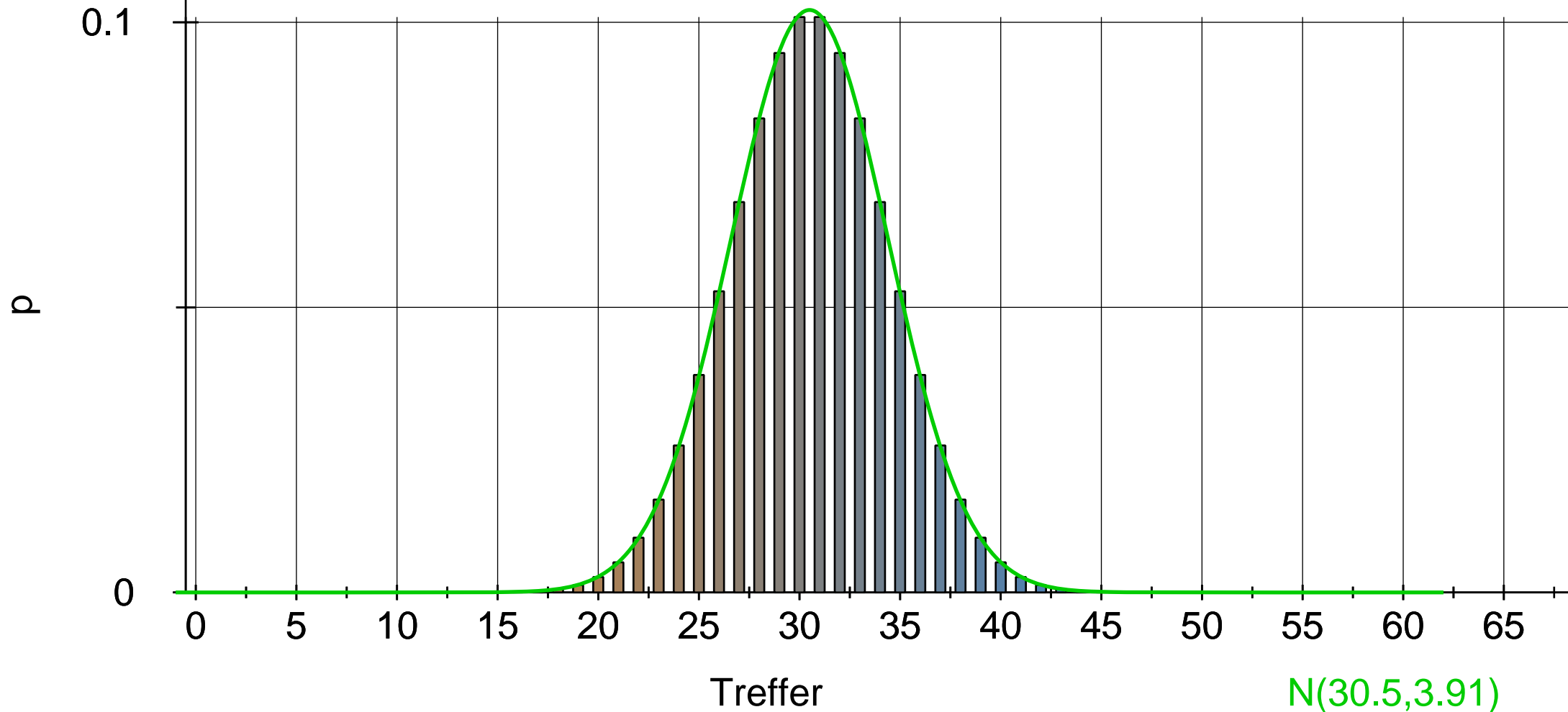
$n=60$ $p=1/2$



Mathematische Statistik

Binomialverteilung

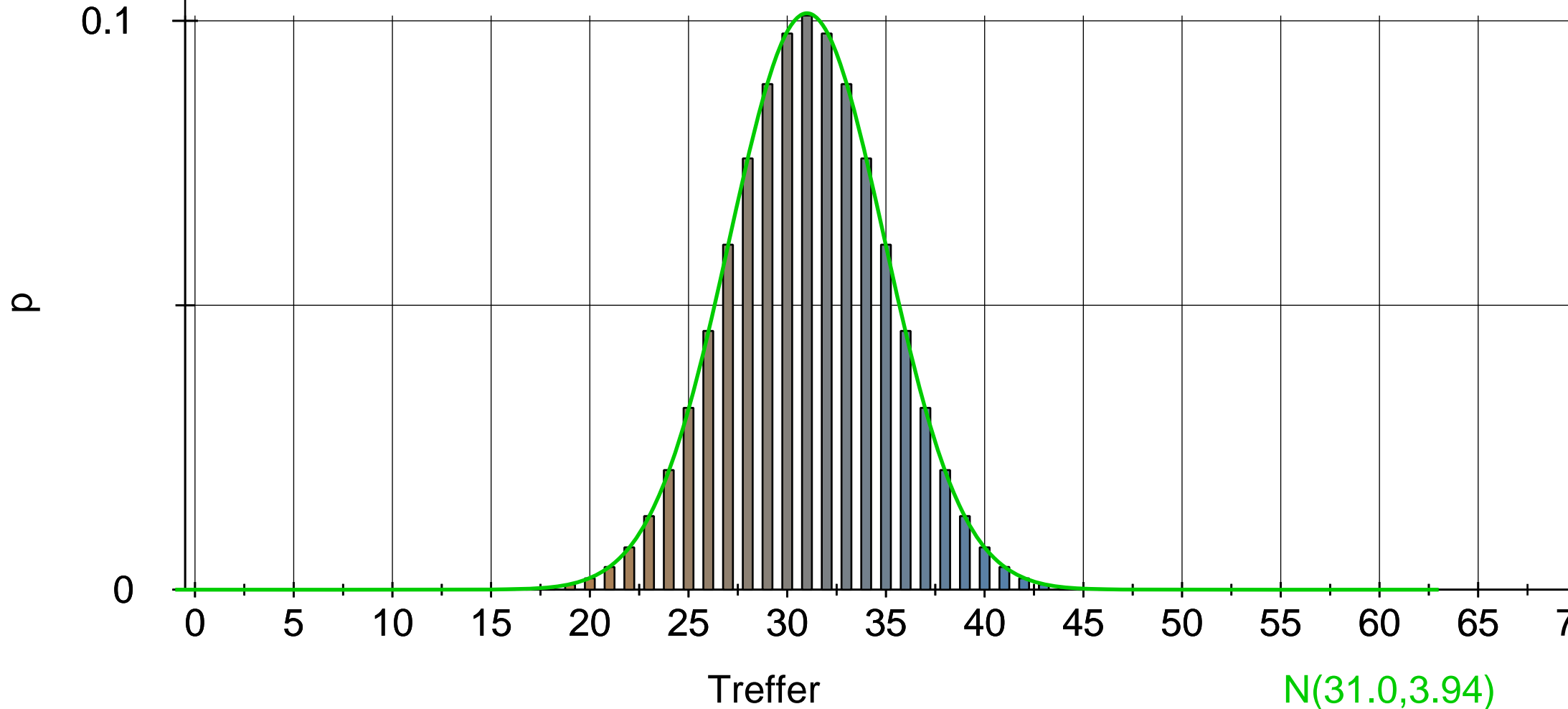
$n=61$ $p=1/2$



Mathematische Statistik

Binomialverteilung

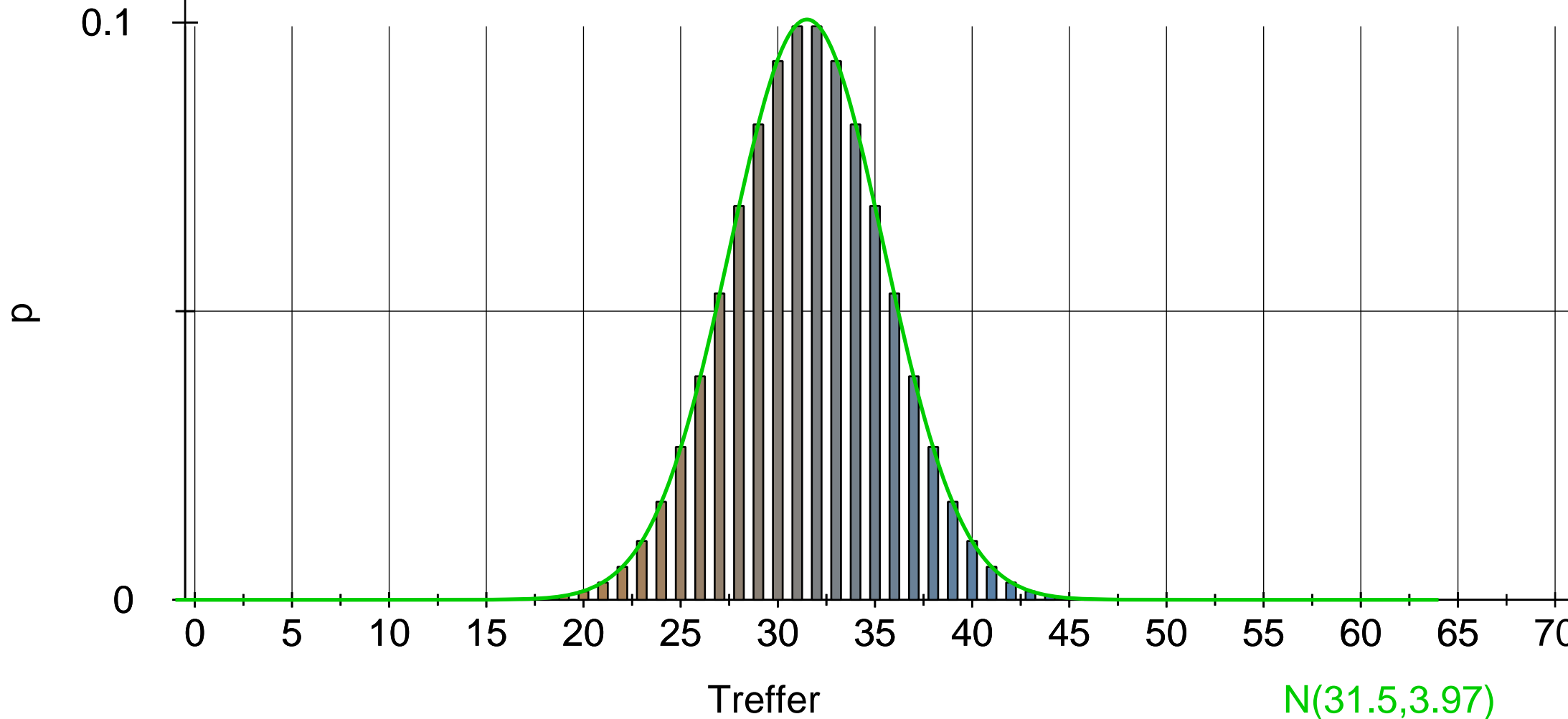
$n=62$ $p=1/2$



Mathematische Statistik

Binomialverteilung

n=63 p=1/2

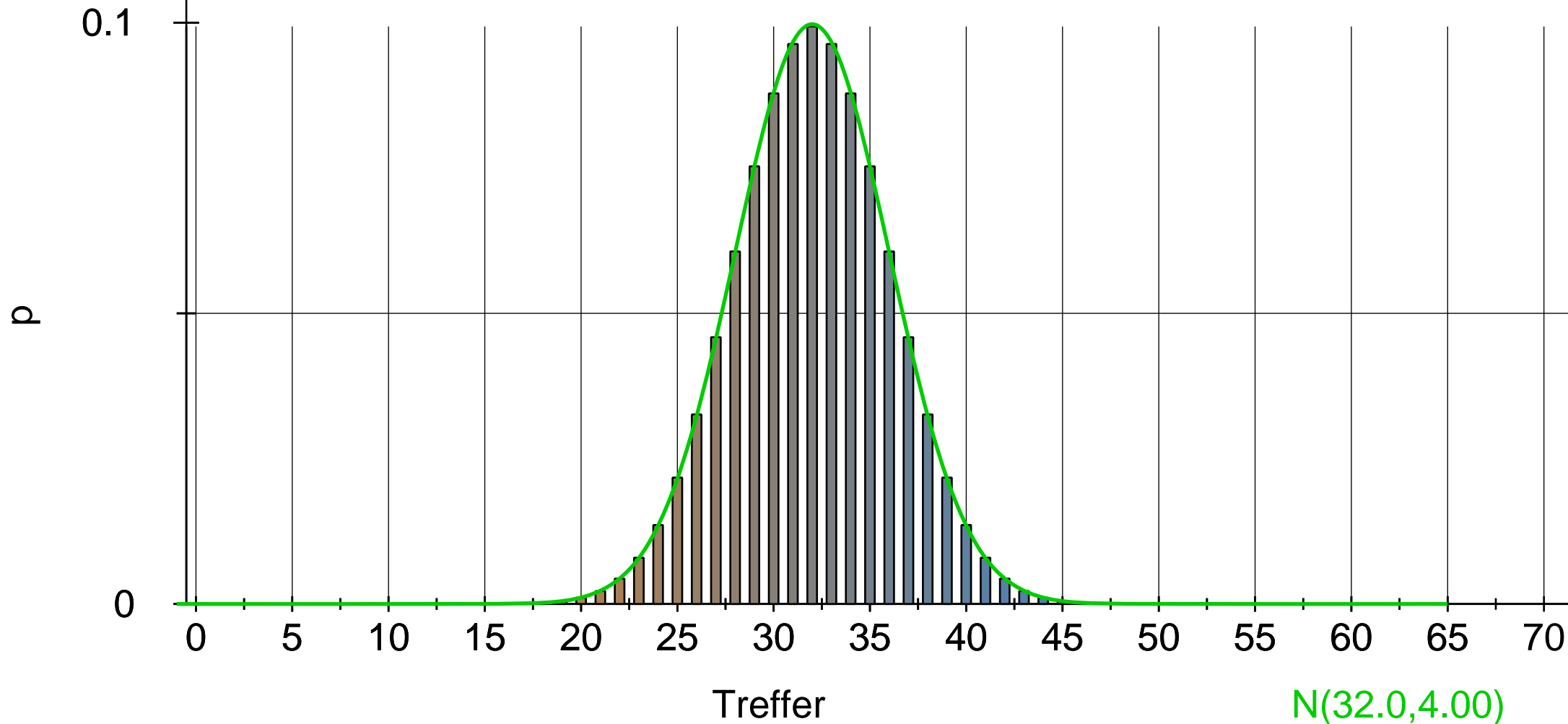


$N(31.5, 3.97)$

Mathematische Statistik

Binomialverteilung

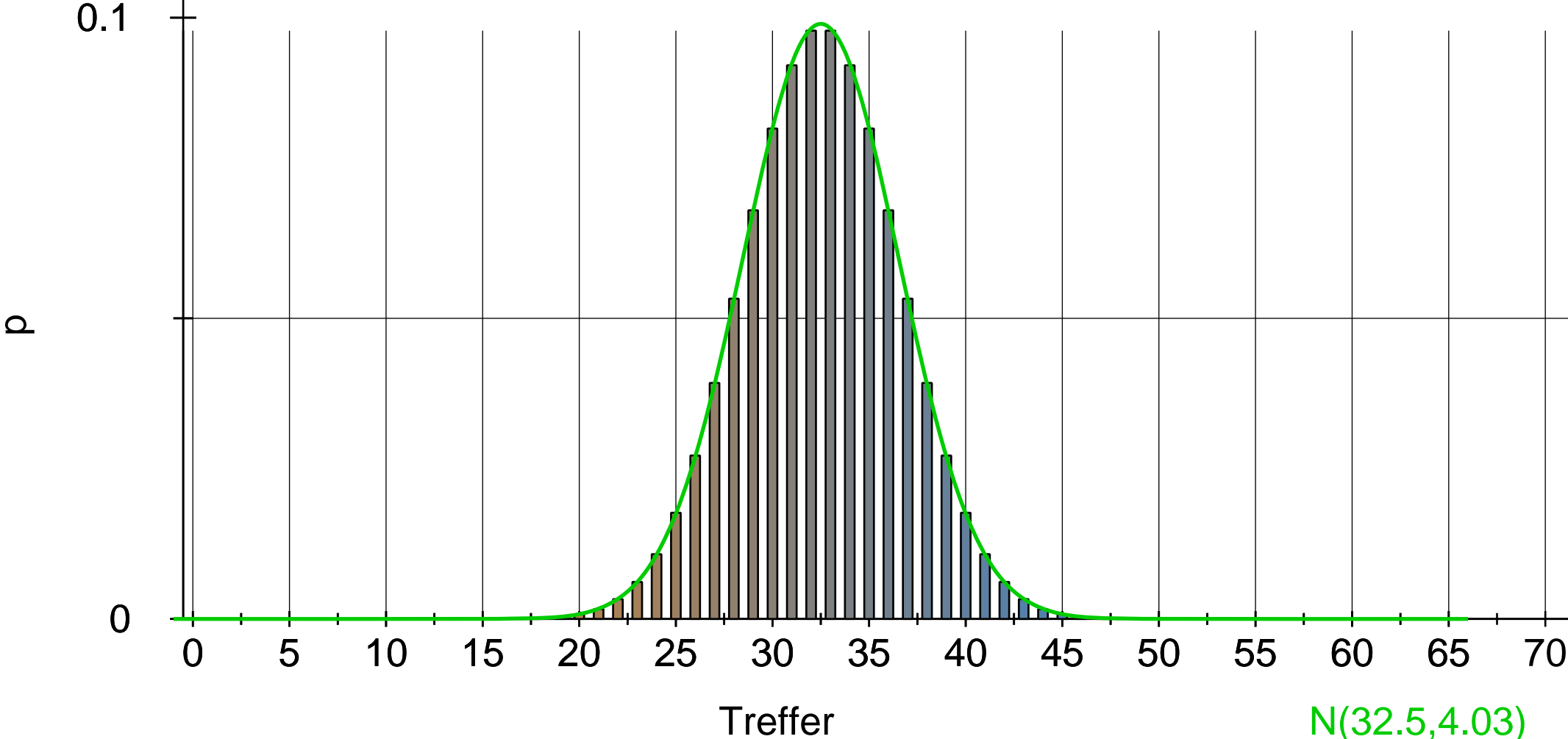
$n=64$ $p=1/2$



Mathematische Statistik

Binomialverteilung

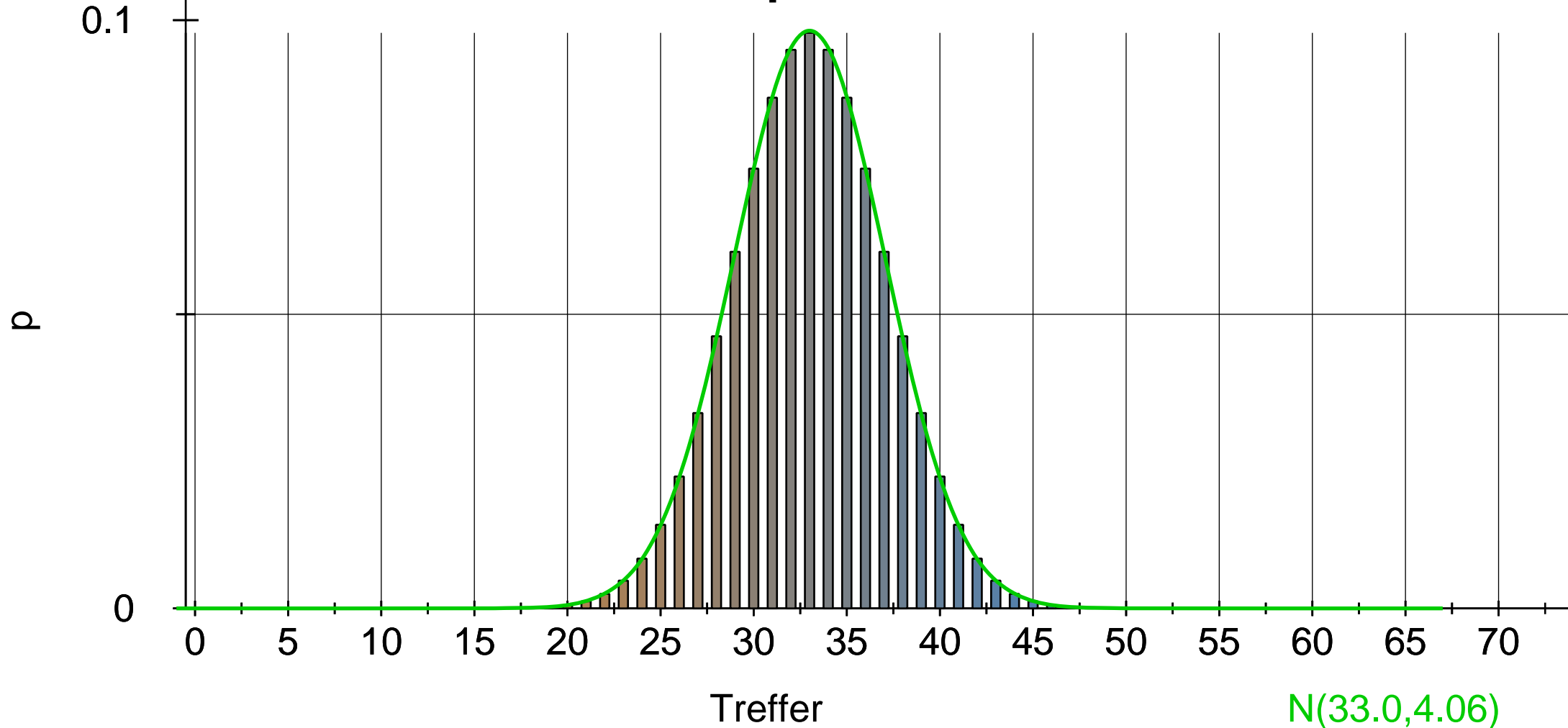
n=65 p=1/2



Mathematische Statistik

Binomialverteilung

n=66 p=1/2



$N(33.0, 4.06)$

Mathematische Statistik

Binomialverteilung

n=67 p=1/2

0.1

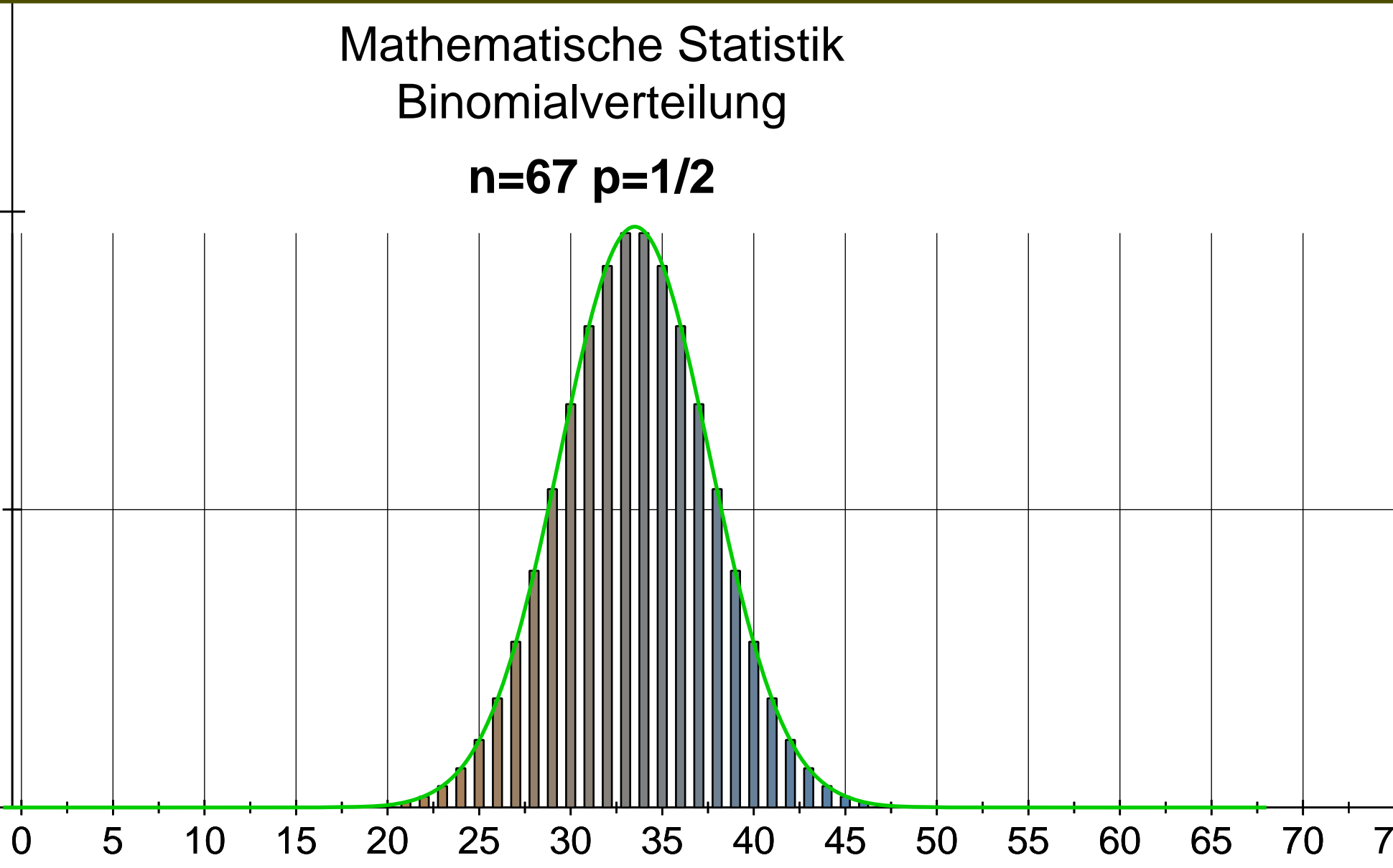
p

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

Treffer

$N(33.5, 4.09)$



Mathematische Statistik

Binomialverteilung

n=68 p=1/2

0.1

p

0

0

5

10

15

20

25

30

35

40

45

50

55

60

65

70

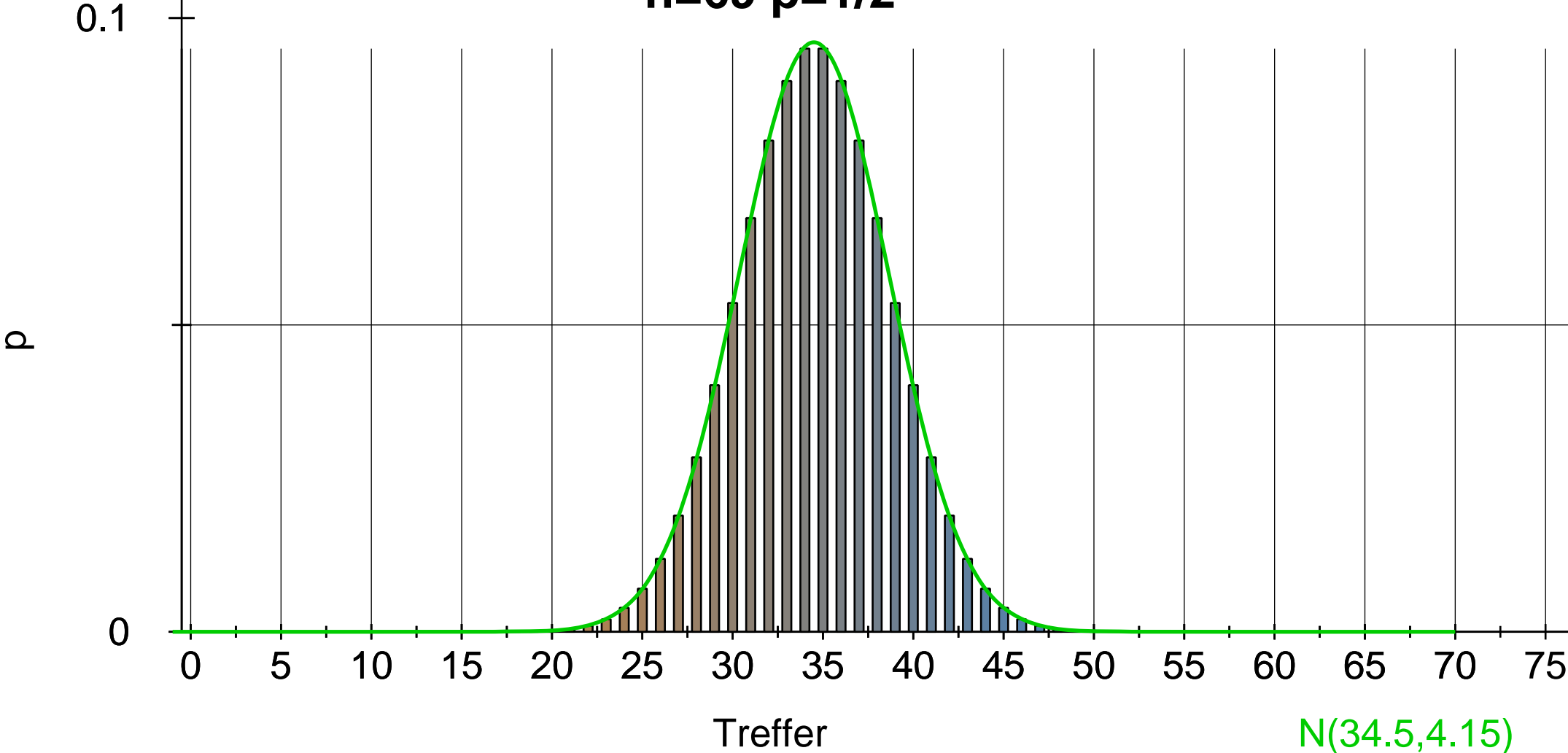
75

Treffer

$N(34.0, 4.12)$

Mathematische Statistik
Binomialverteilung

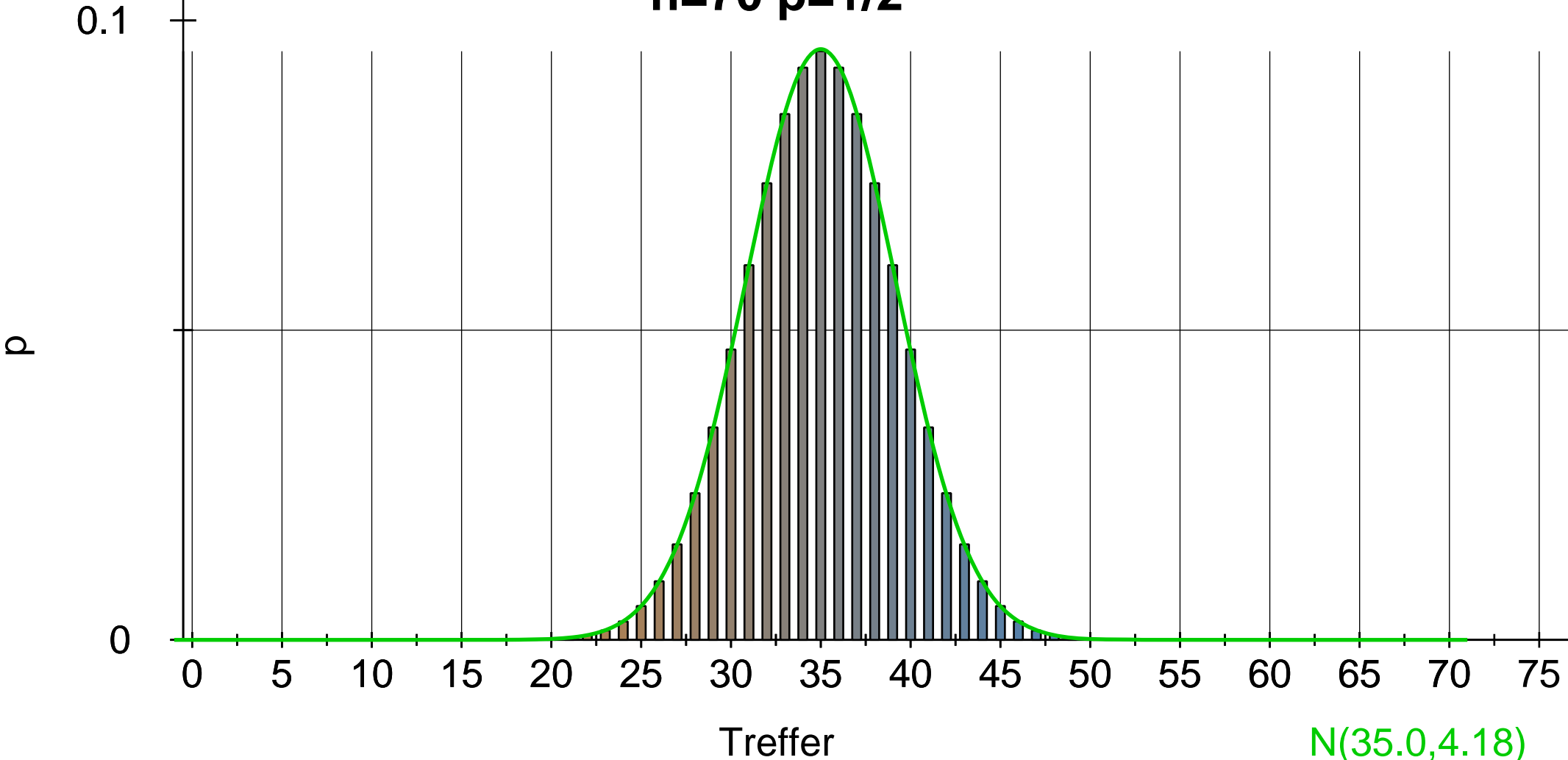
n=69 p=1/2



Mathematische Statistik

Binomialverteilung

n=70 p=1/2



$N(35.0, 4.18)$

Mathematische Statistik

Binomialverteilung

n=71 p=1/2

0.1

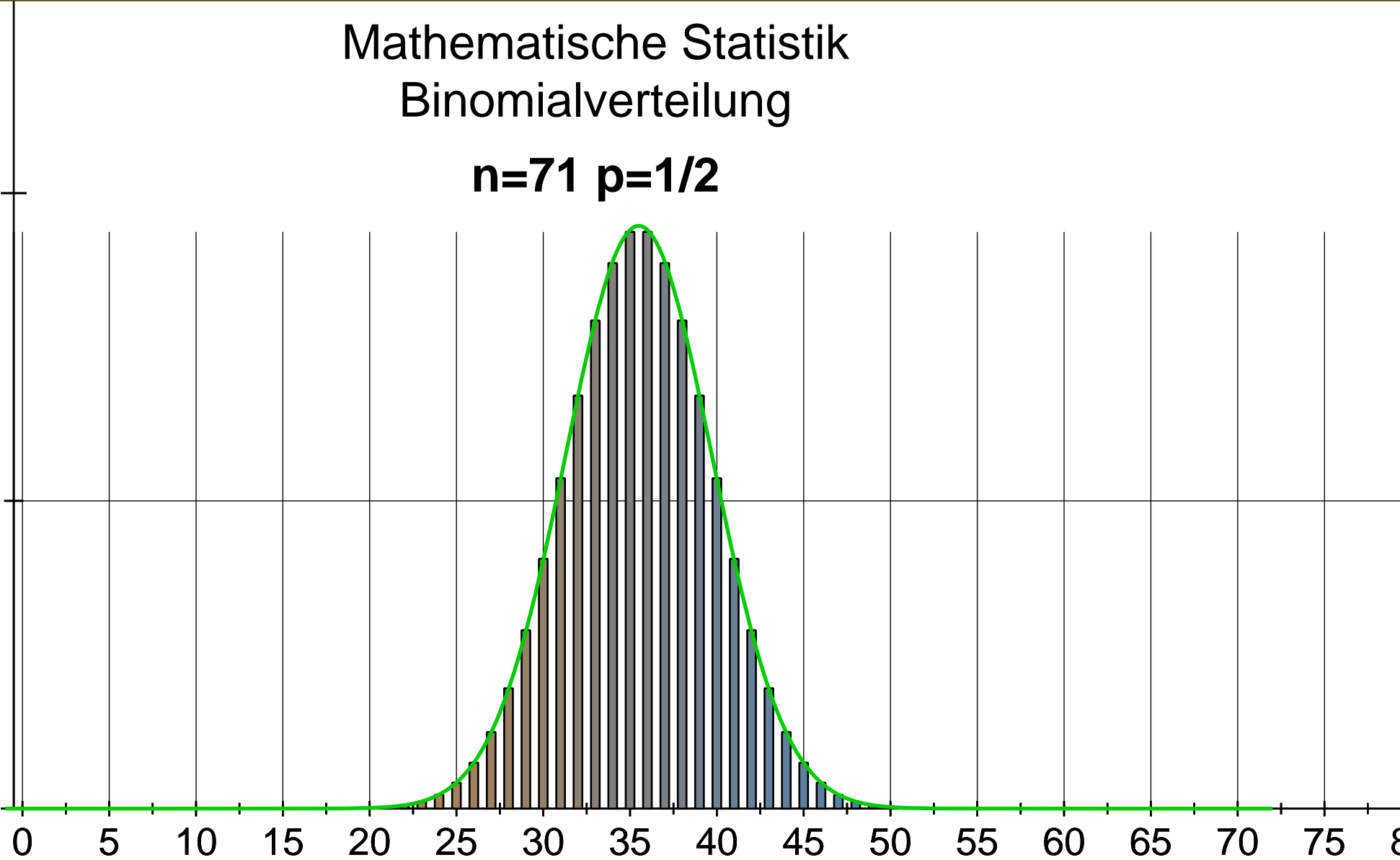
p

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80

Treffer

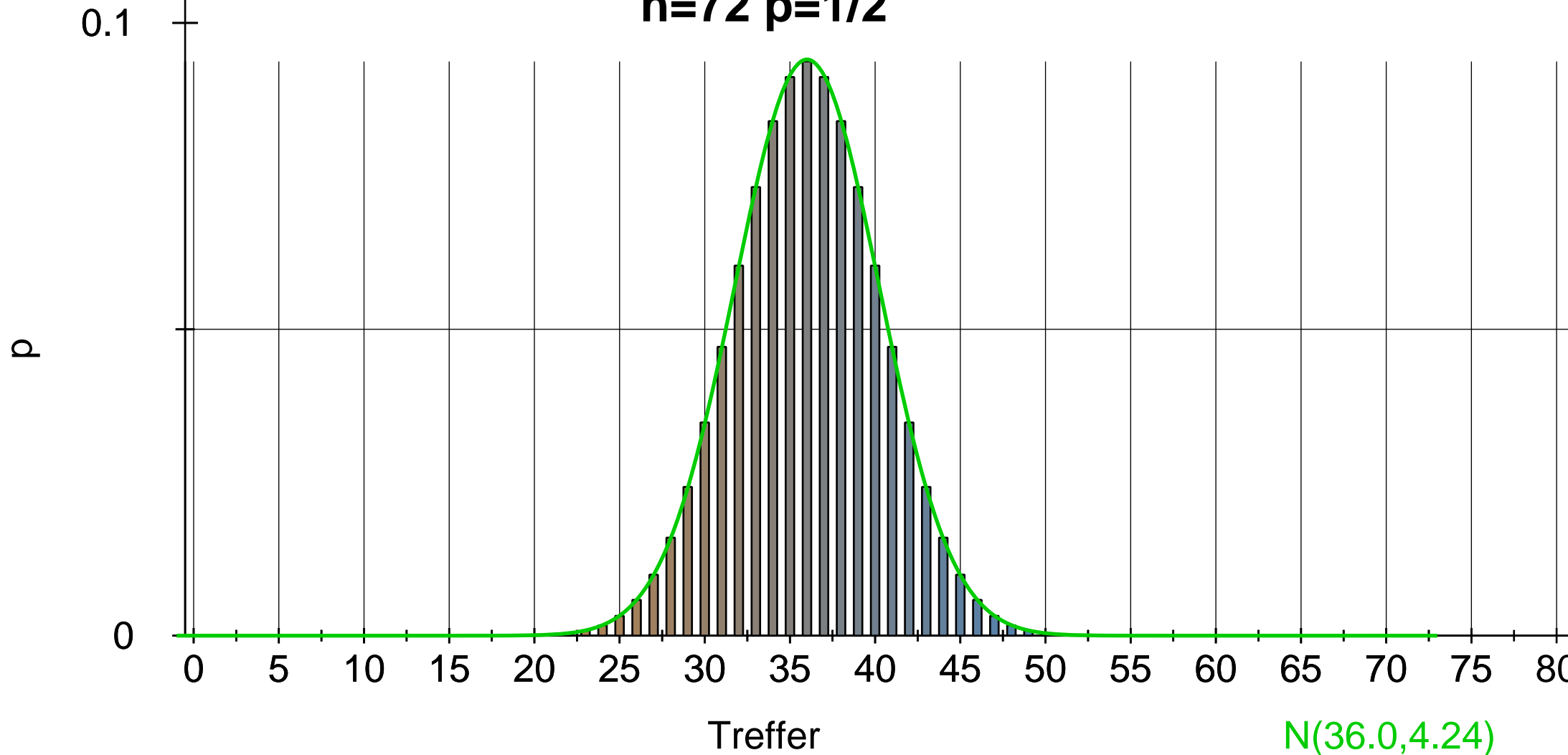
$N(35.5, 4.21)$



Mathematische Statistik

Binomialverteilung

$n=72$ $p=1/2$

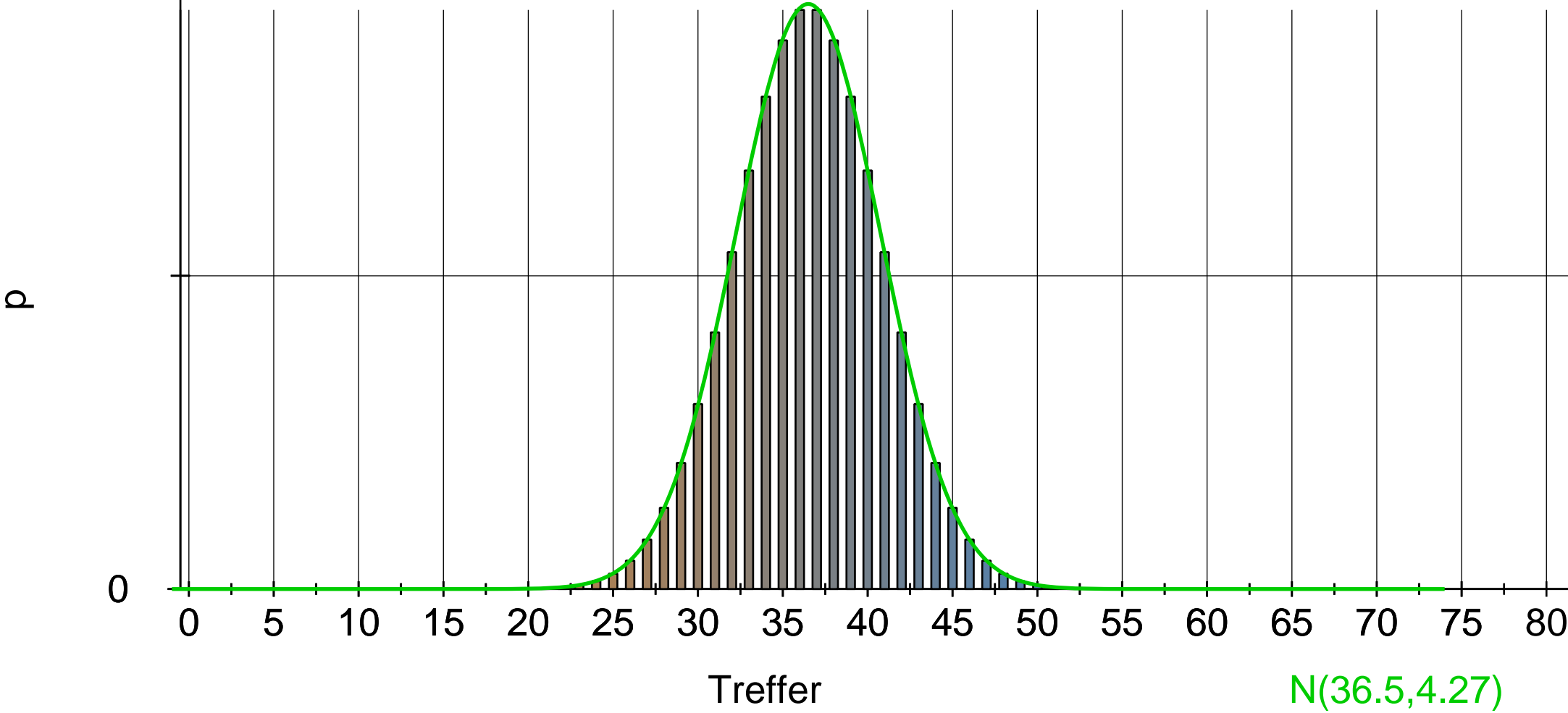


$N(36.0, 4.24)$

Mathematische Statistik

Binomialverteilung

n=73 p=1/2

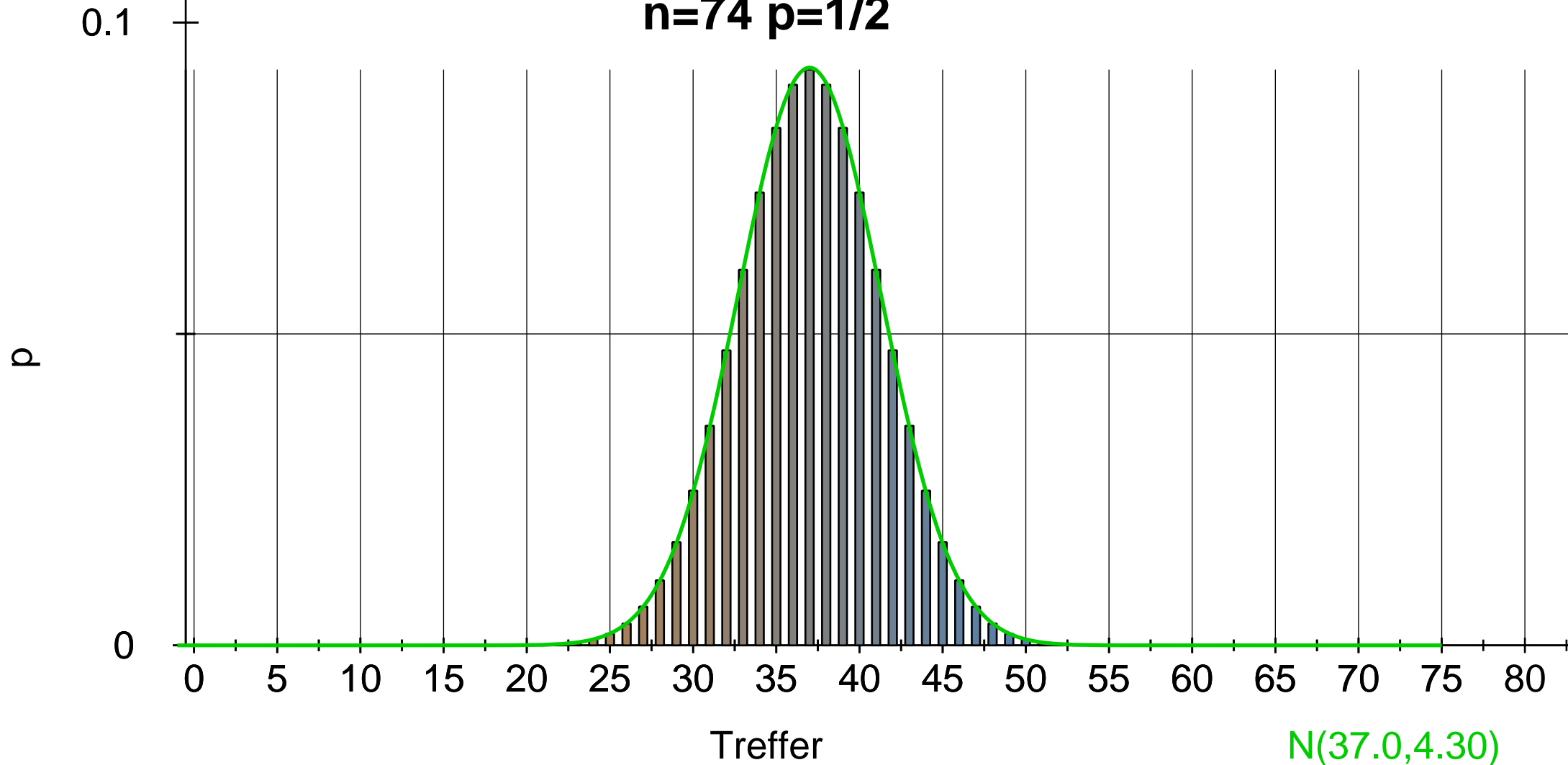


$N(36.5, 4.27)$

Mathematische Statistik

Binomialverteilung

$n=74$ $p=1/2$



Mathematische Statistik

Binomialverteilung

n=75 p=1/2

0.1

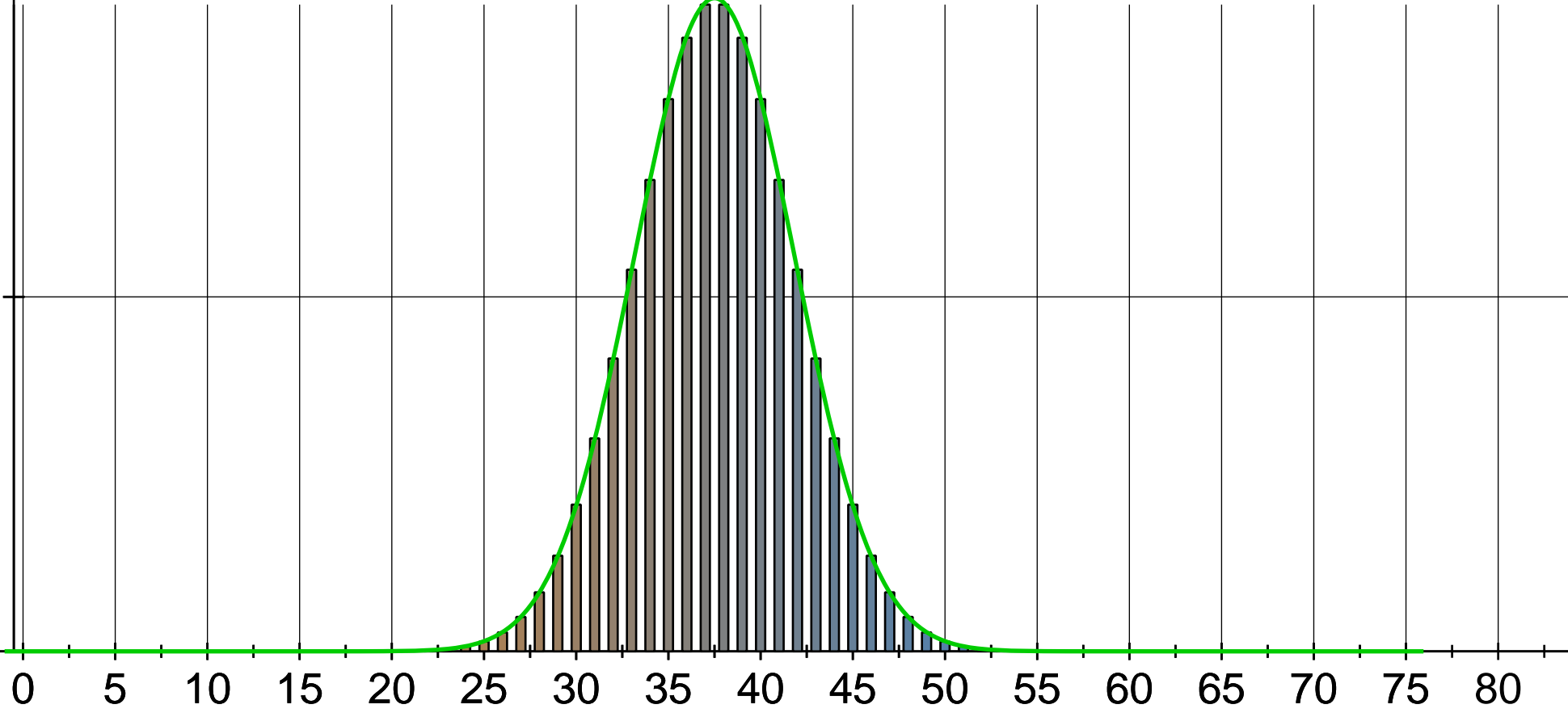
p

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85

Treffer

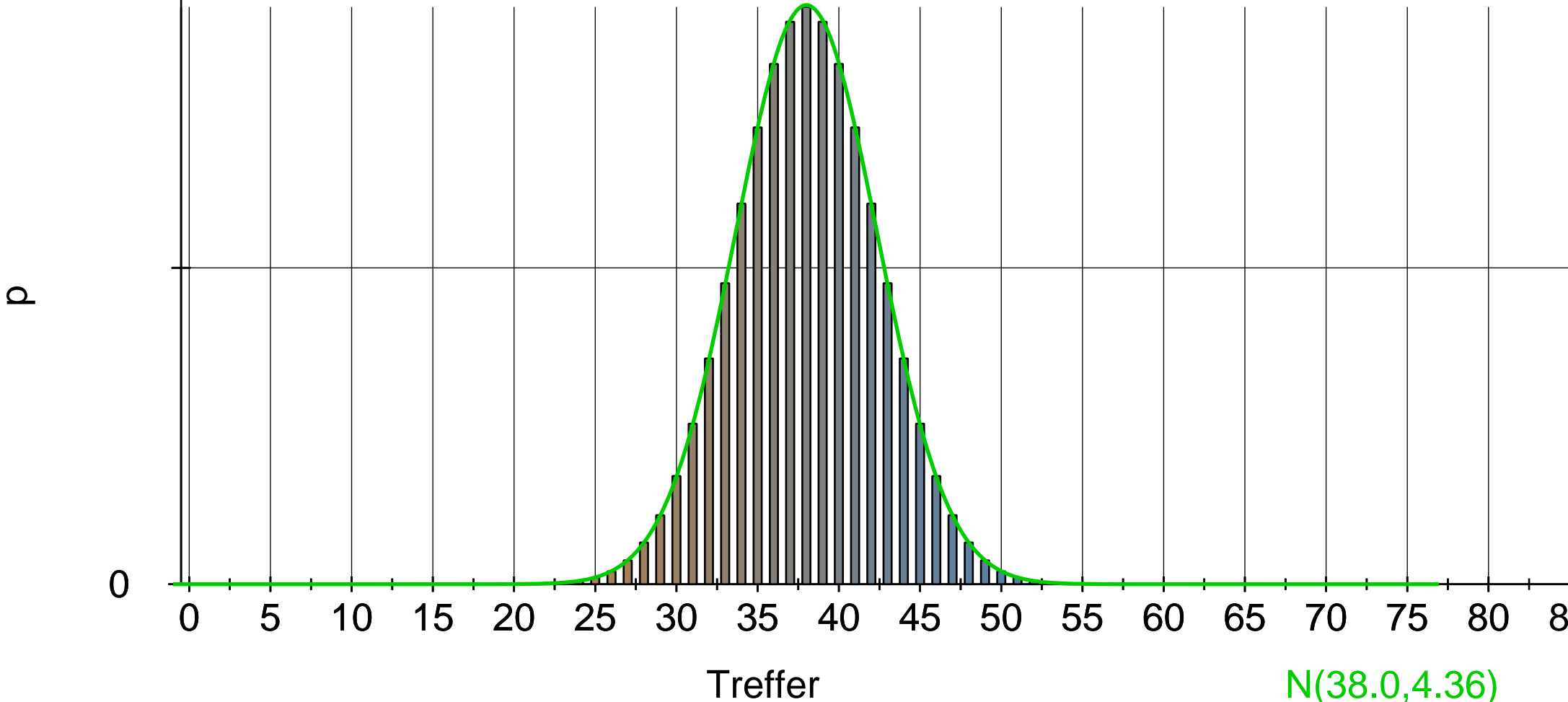
$N(37.5, 4.33)$



Mathematische Statistik

Binomialverteilung

n=76 p=1/2

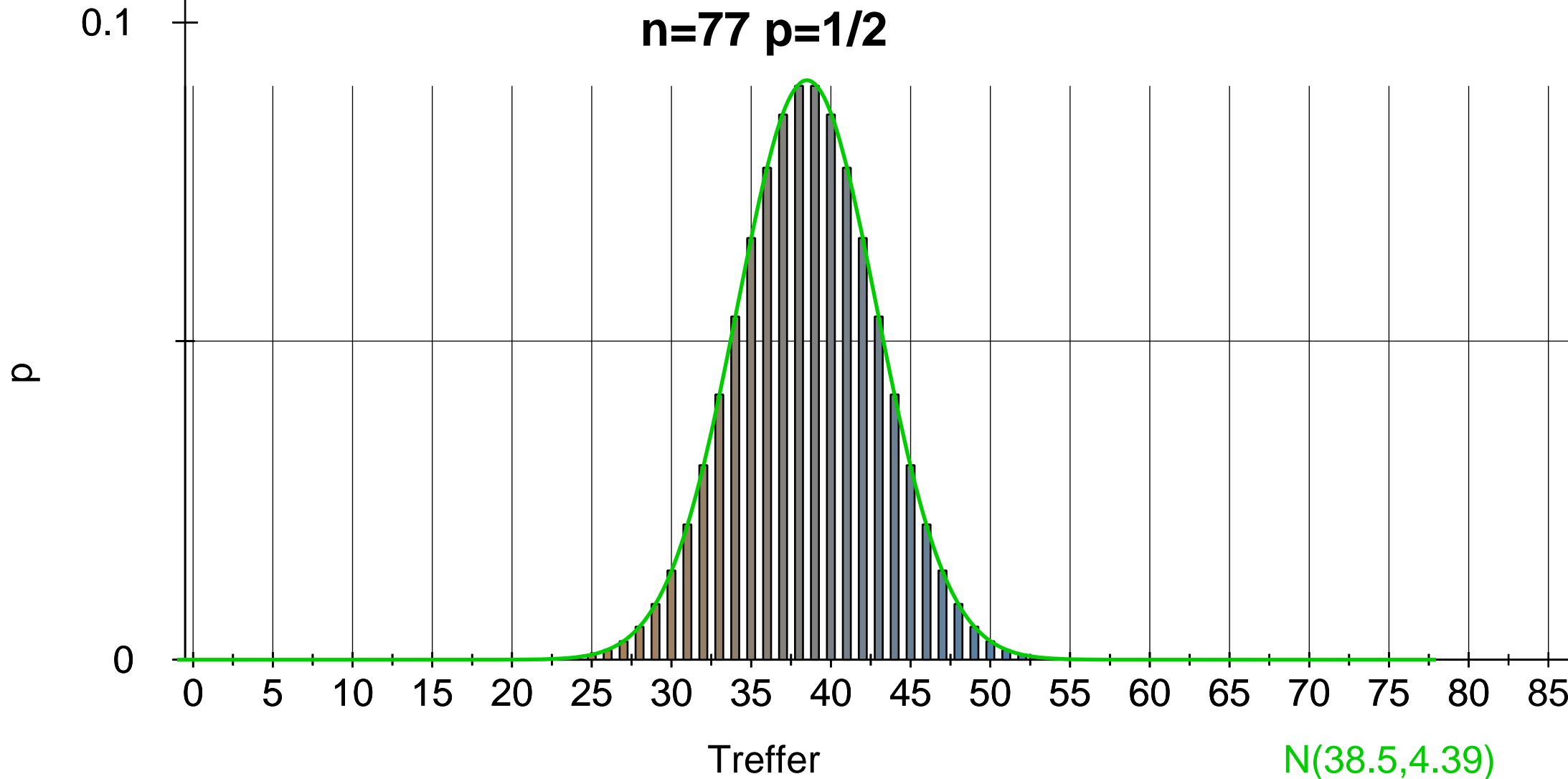


$N(38.0, 4.36)$

Mathematische Statistik

Binomialverteilung

$n=77$ $p=1/2$

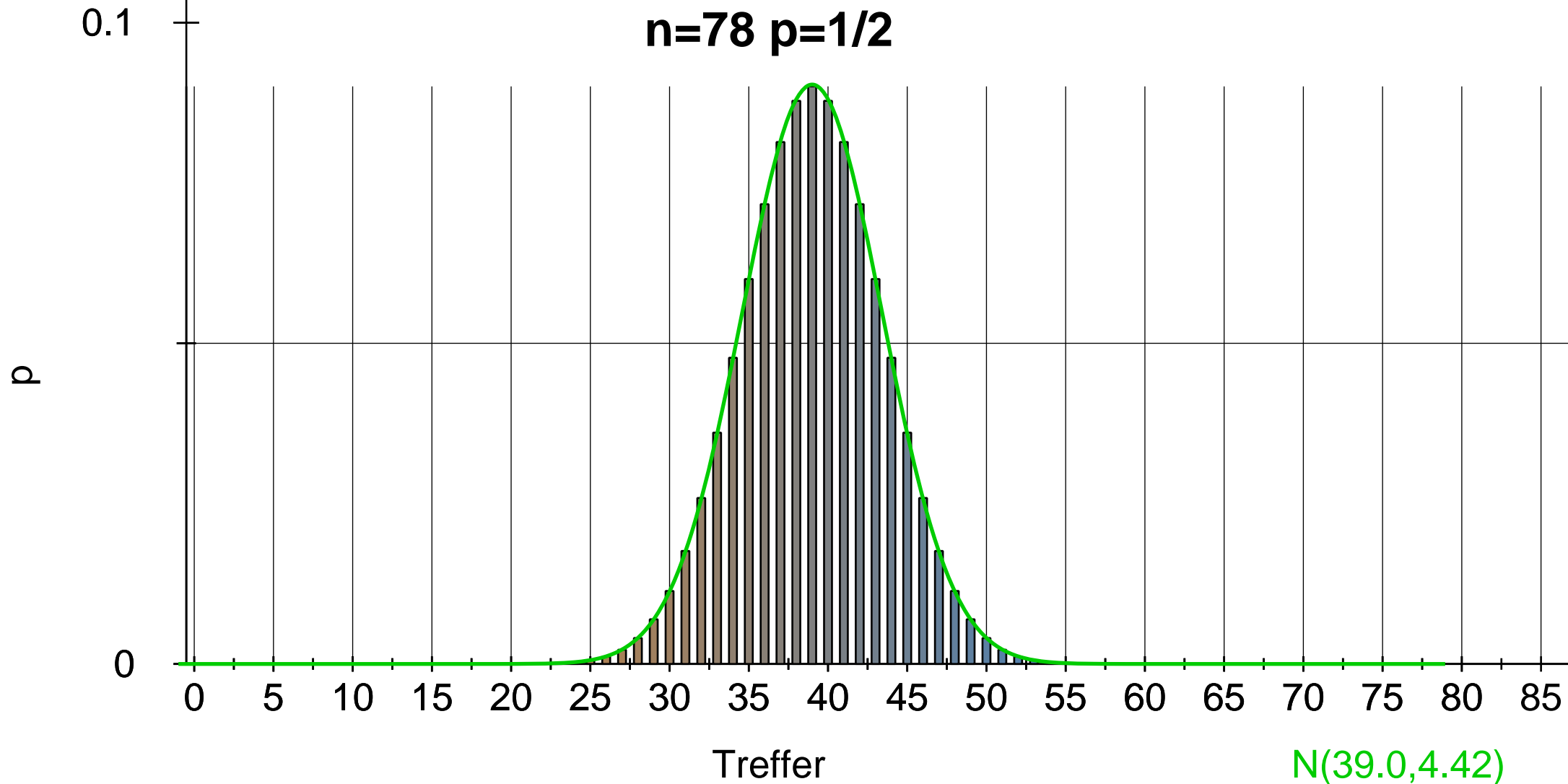


$N(38.5, 4.39)$

Mathematische Statistik

Binomialverteilung

$n=78$ $p=1/2$



$N(39.0, 4.42)$

Mathematische Statistik

Binomialverteilung

$n=79$ $p=1/2$

p

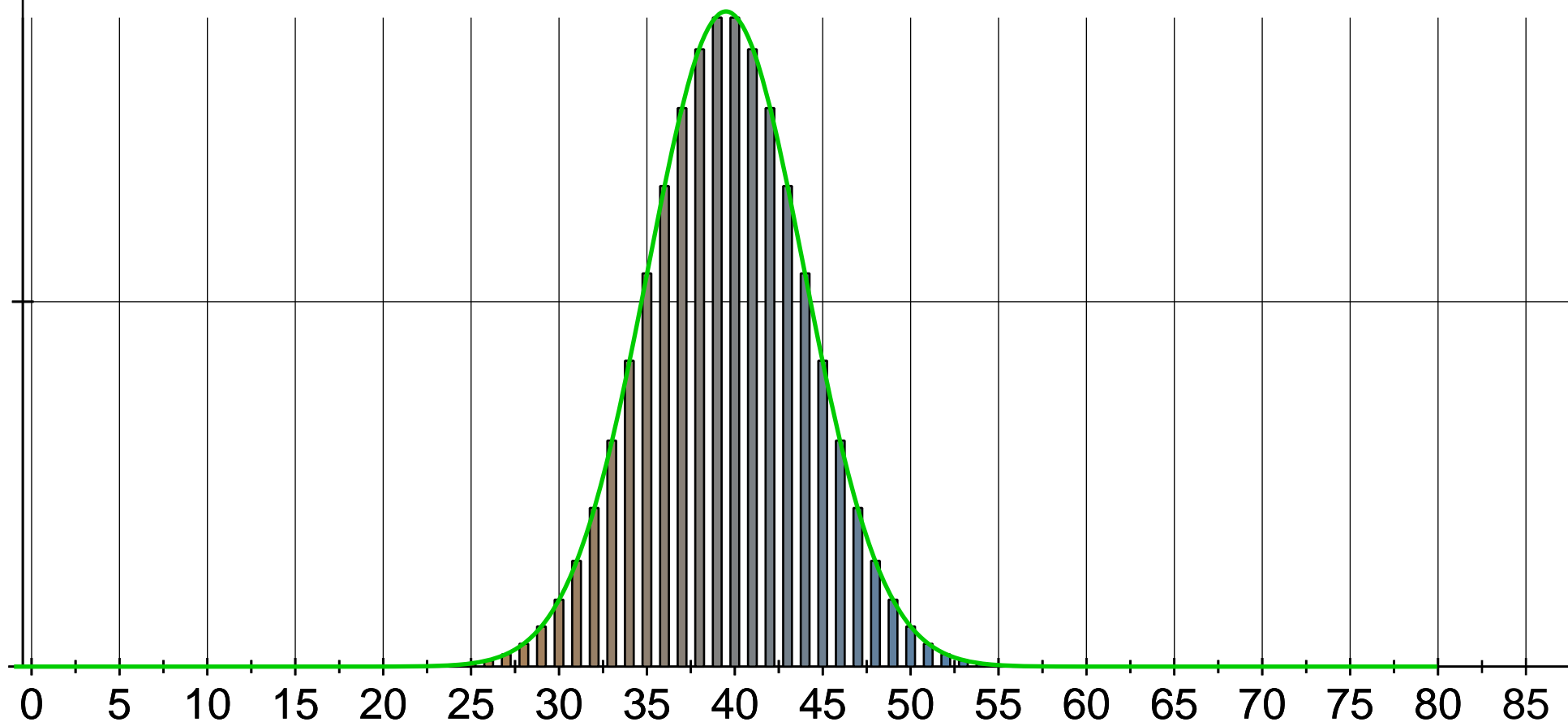
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85

Treffer

$N(39.5, 4.44)$



Mathematische Statistik

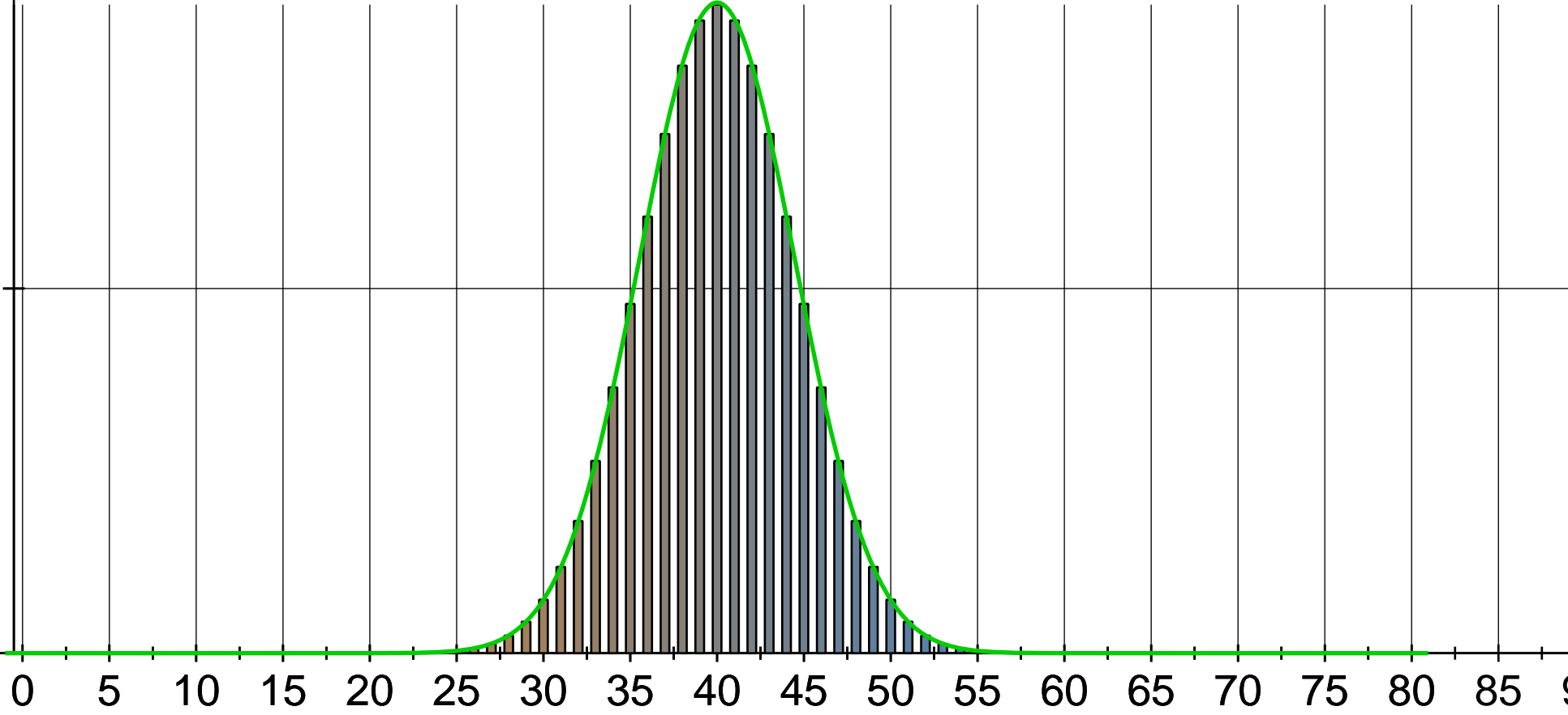
Binomialverteilung

n=80 p=1/2

p

0.1

0



Treffer

$N(40.0, 4.47)$

Mathematische Statistik

Binomialverteilung

n=81 p=1/2

p

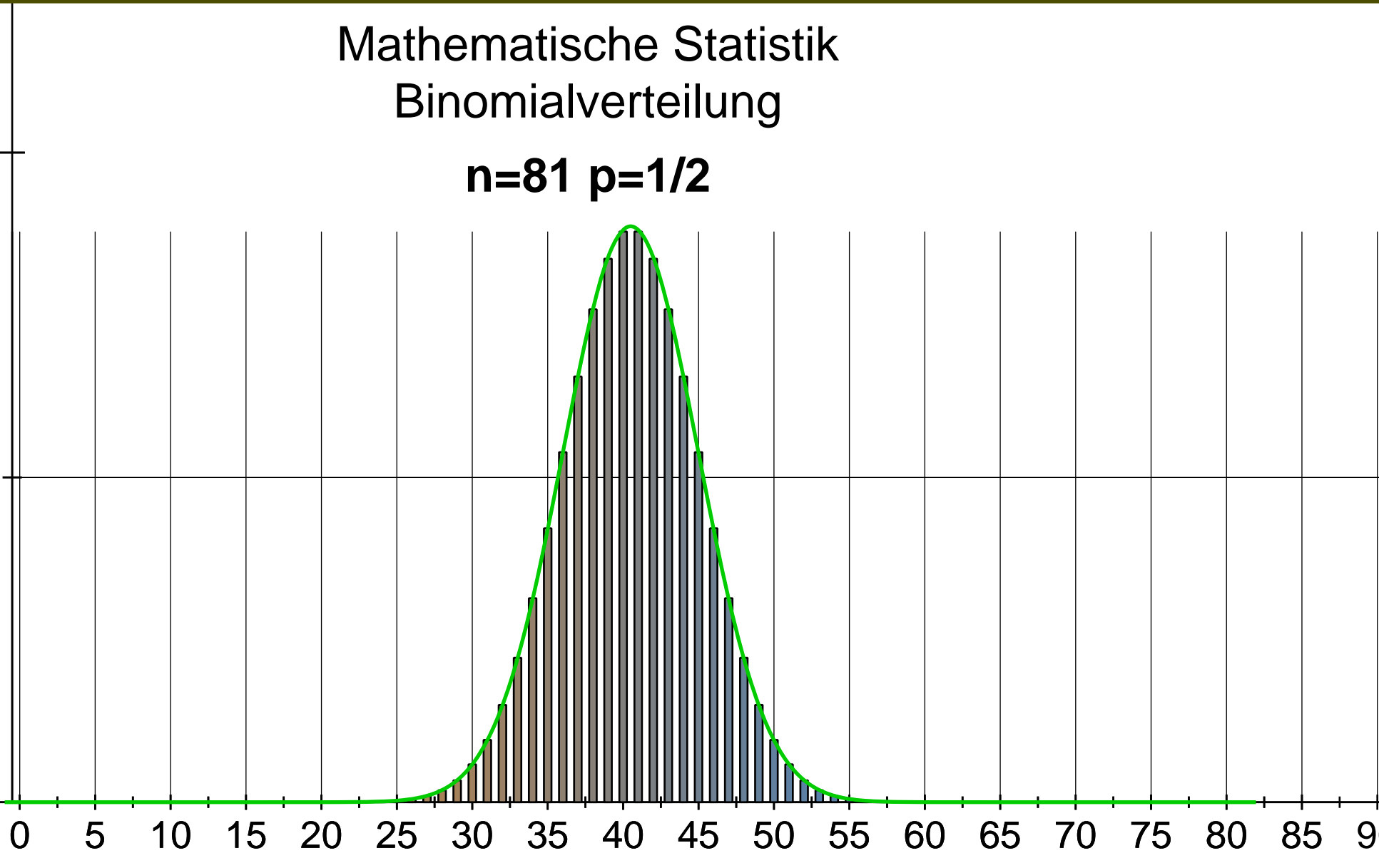
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90

Treffer

$N(40.5, 4.50)$



Mathematische Statistik

Binomialverteilung

n=82 p=1/2

p

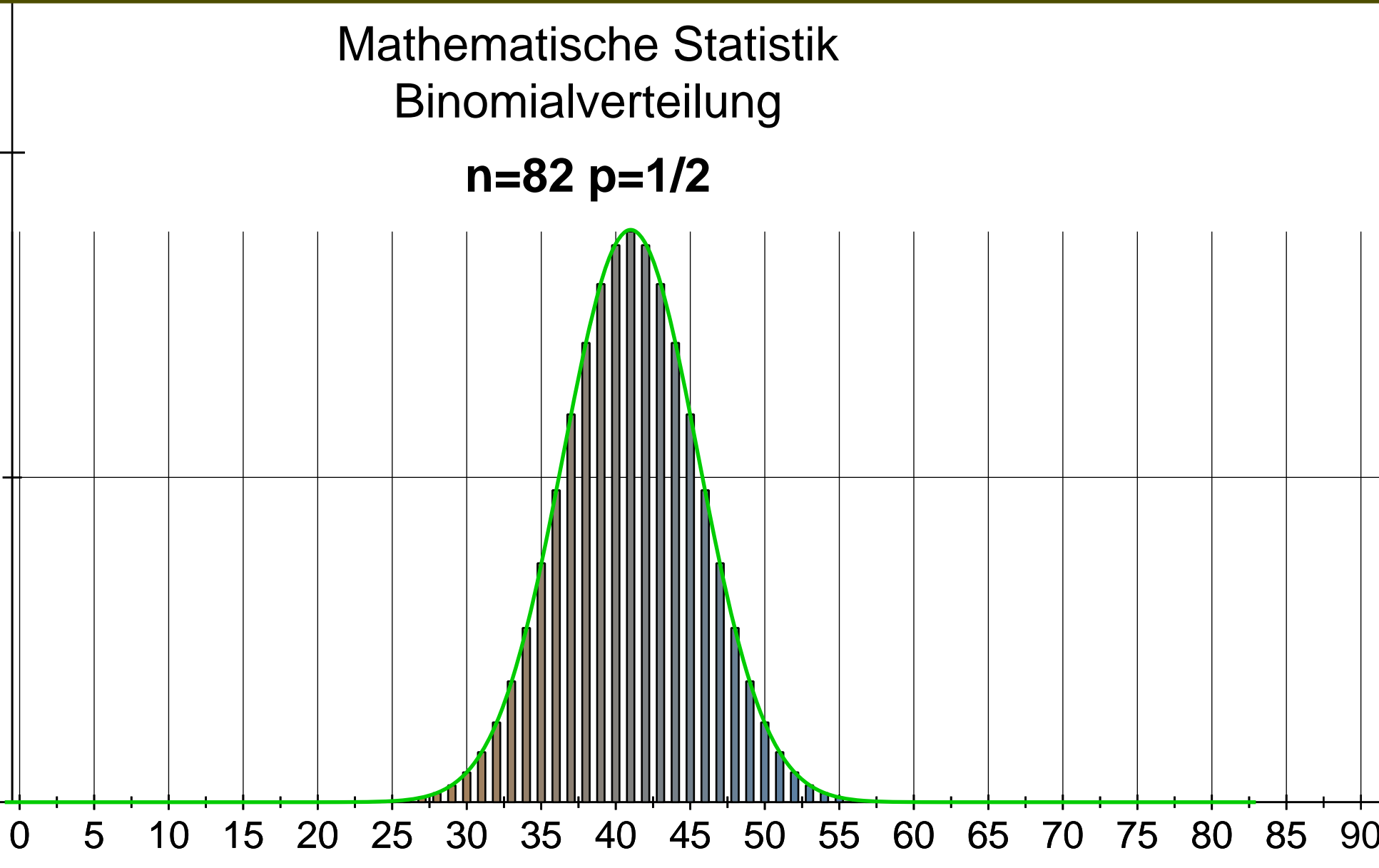
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90

Treffer

$N(41.0, 4.53)$



Mathematische Statistik

Binomialverteilung

n=83 p=1/2

p

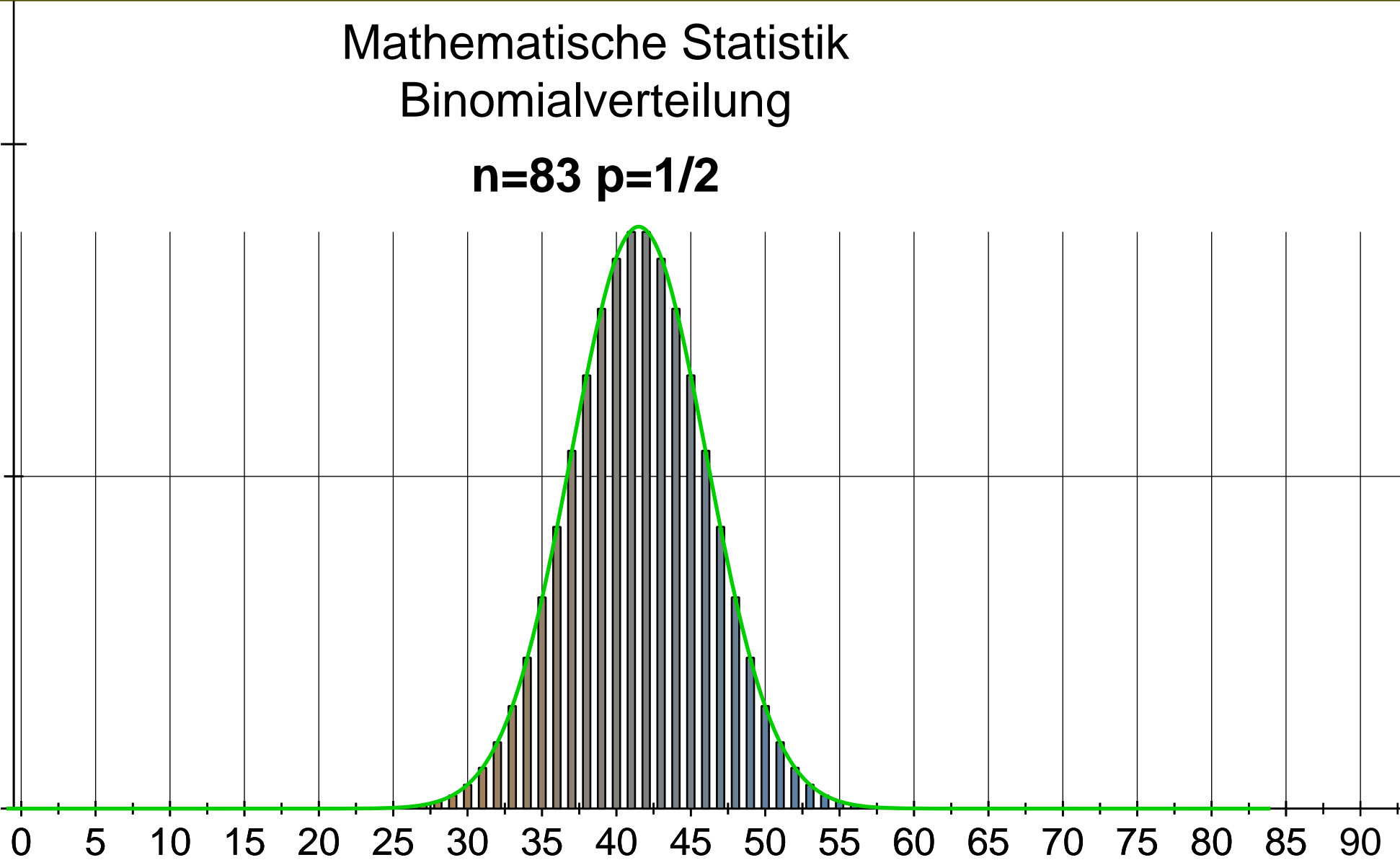
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90

Treffer

$N(41.5, 4.56)$



Mathematische Statistik

Binomialverteilung

$n=84$ $p=1/2$

p

0.1

0

0

5

10

15

20

25

30

35

40

45

50

55

60

65

70

75

80

85

90

95

100

Treffer

$N(42.0, 4.58)$

Mathematische Statistik

Binomialverteilung

n=85 p=1/2

p

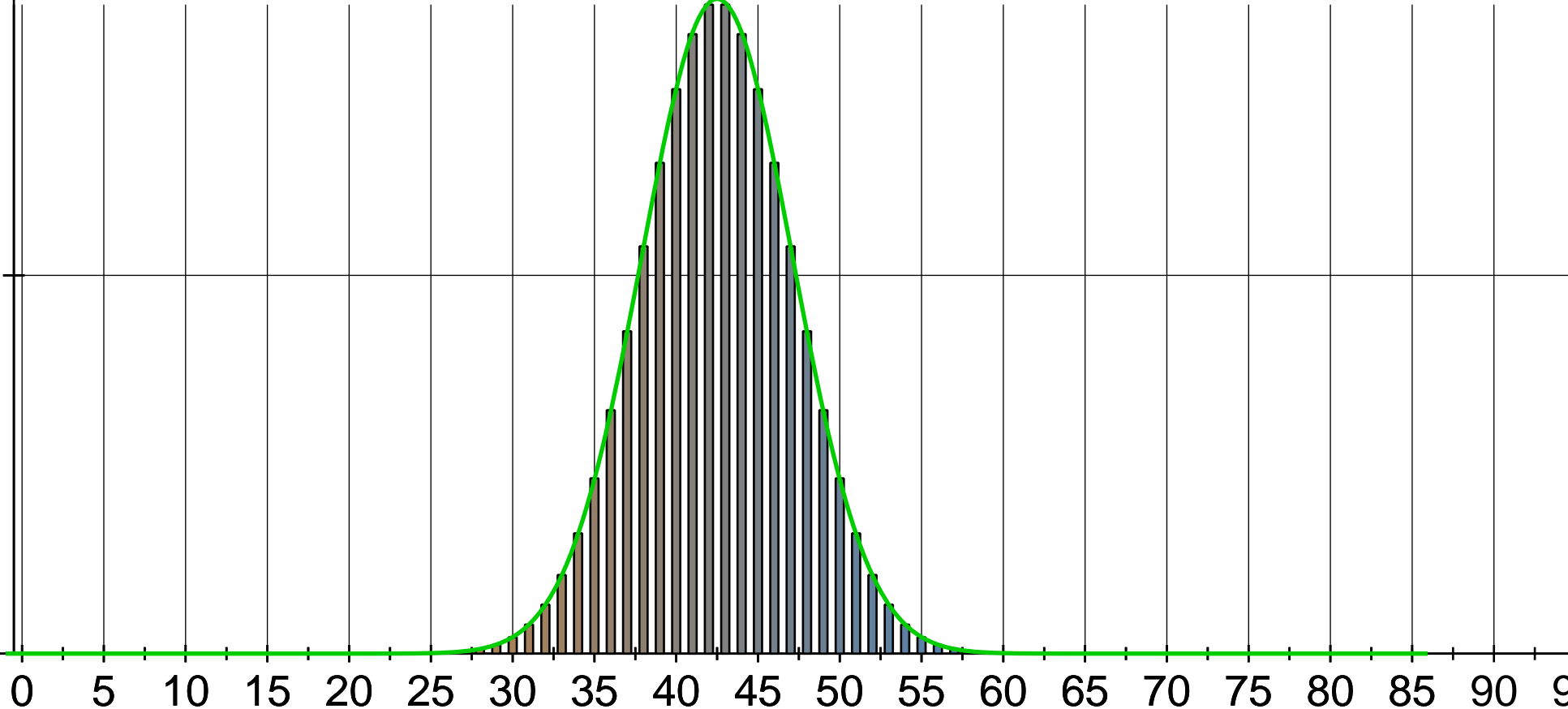
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95

Treffer

$N(42.5, 4.61)$



Mathematische Statistik
Binomialverteilung

n=86 p=1/2

p

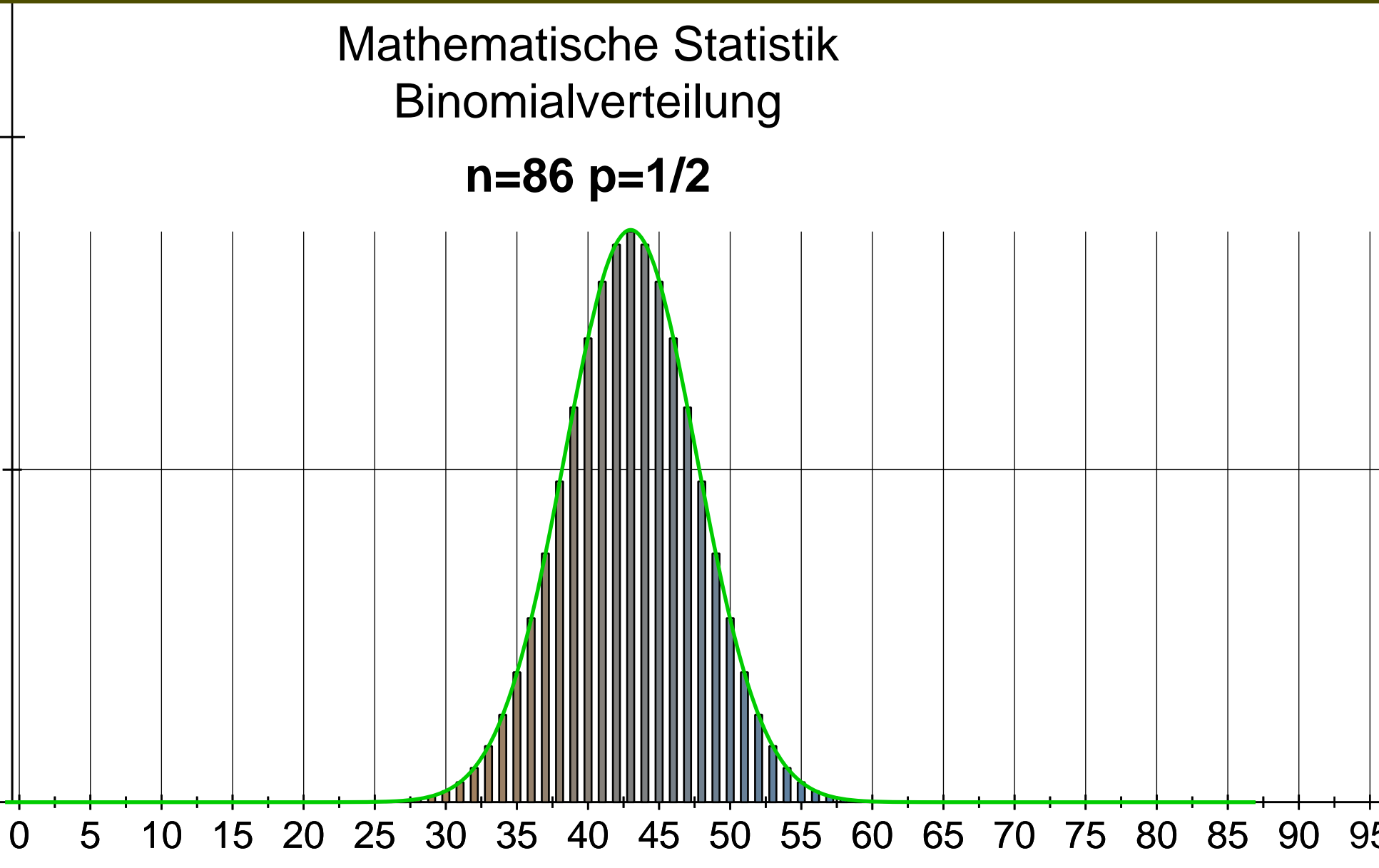
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95

Treffer

$N(43.0, 4.64)$



Mathematische Statistik

Binomialverteilung

n=87 p=1/2

p

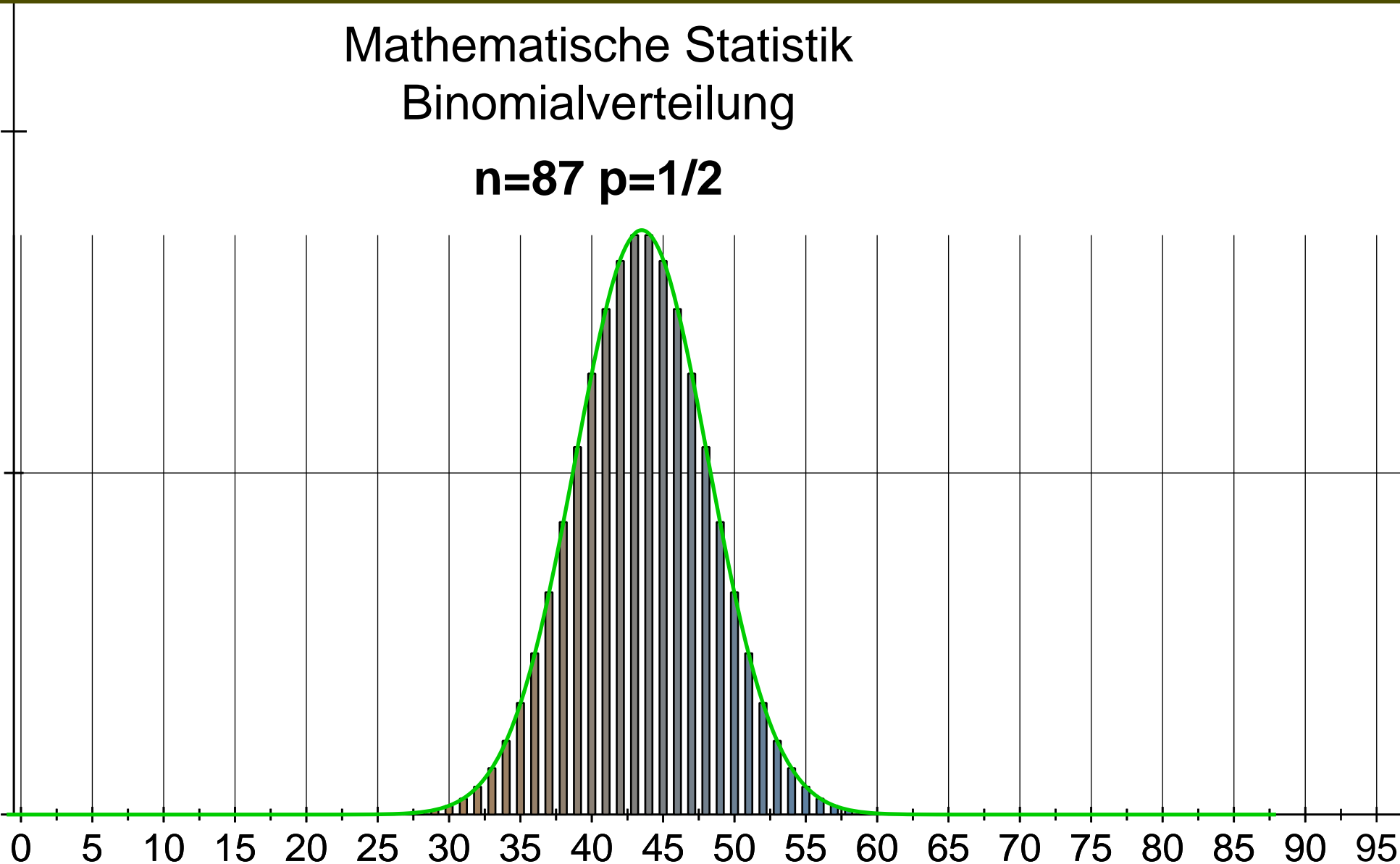
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95

Treffer

$N(43.5, 4.66)$



Mathematische Statistik

Binomialverteilung

n=88 p=1/2

p

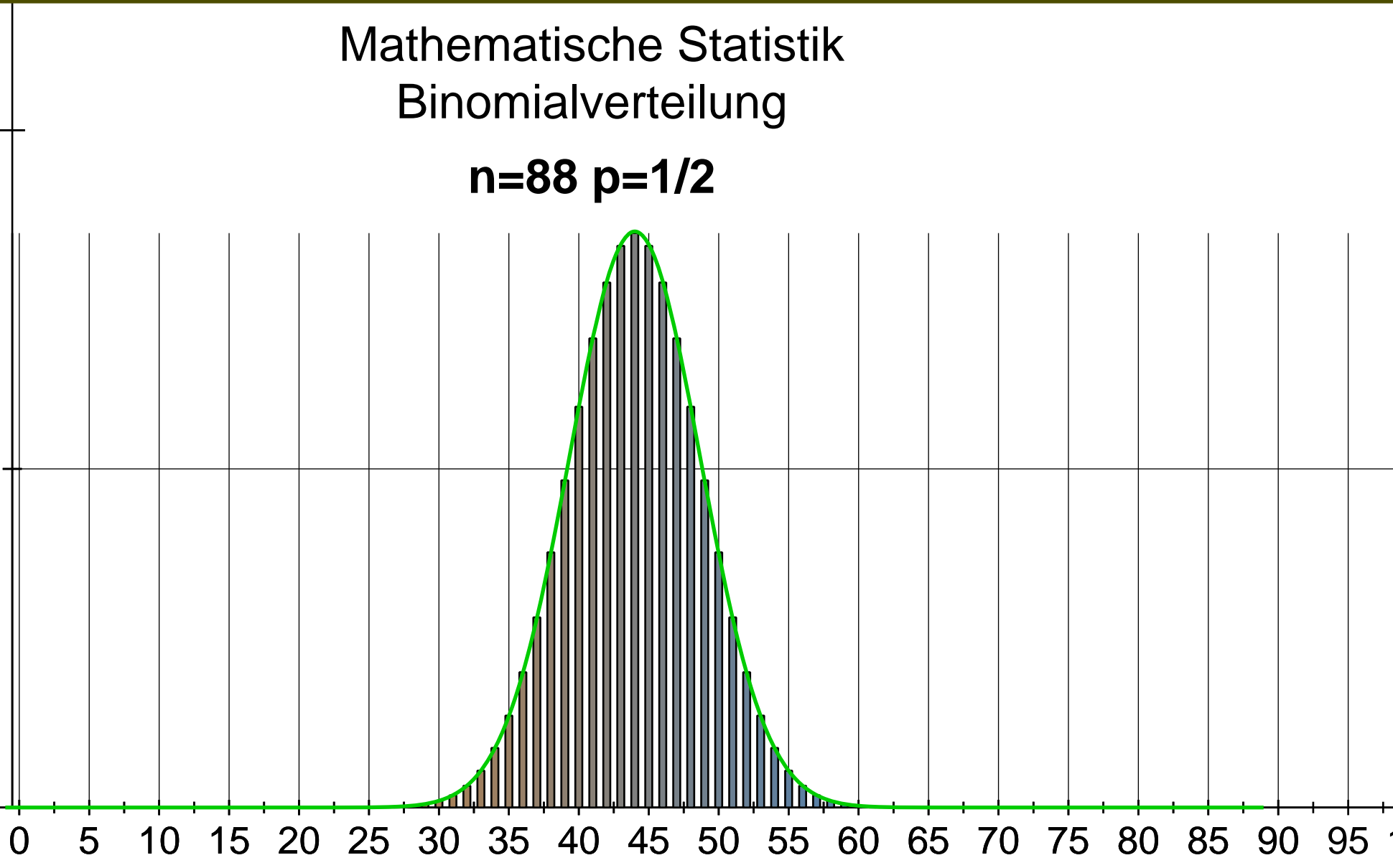
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(44.0, 4.69)$



Mathematische Statistik

Binomialverteilung

n=89 p=1/2

p

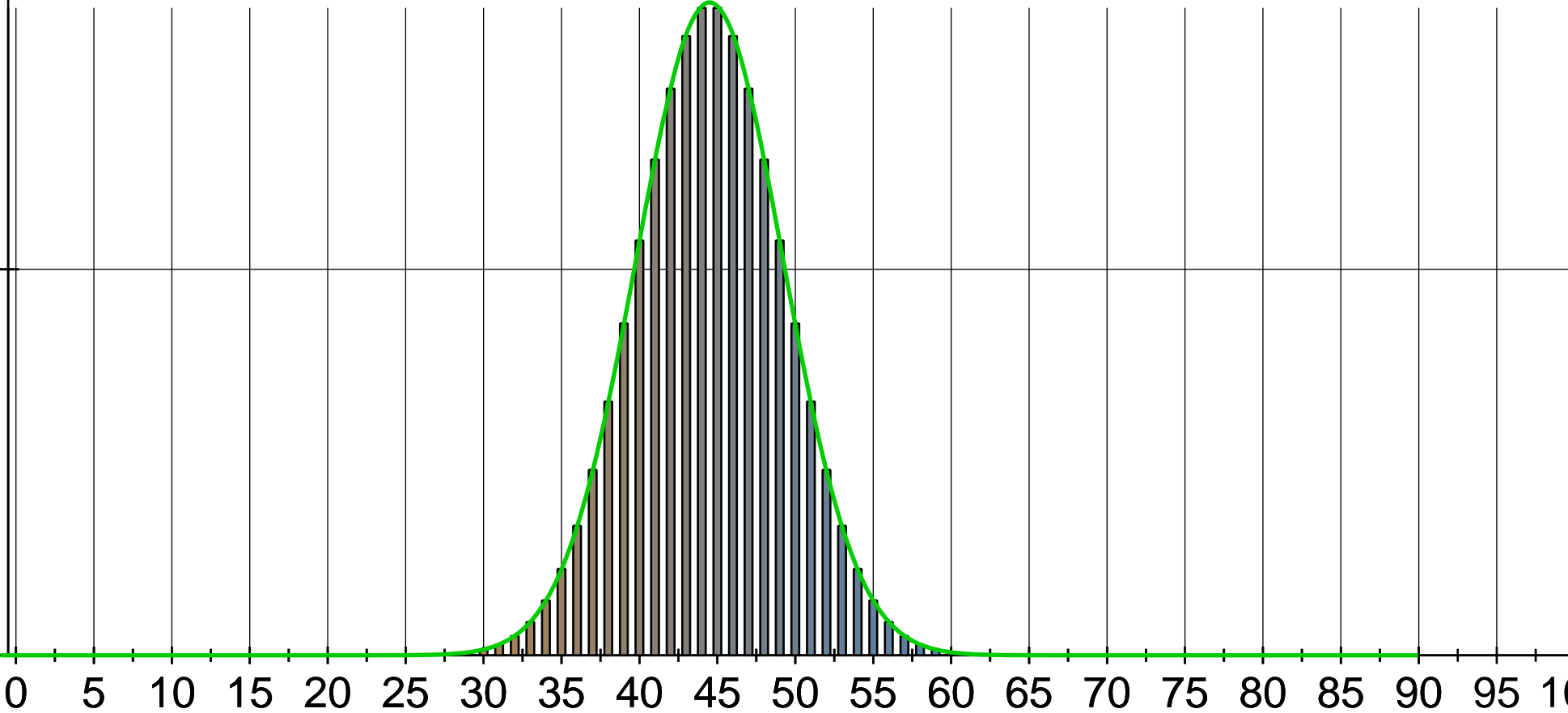
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(44.5, 4.72)$



Mathematische Statistik

Binomialverteilung

n=90 p=1/2

p

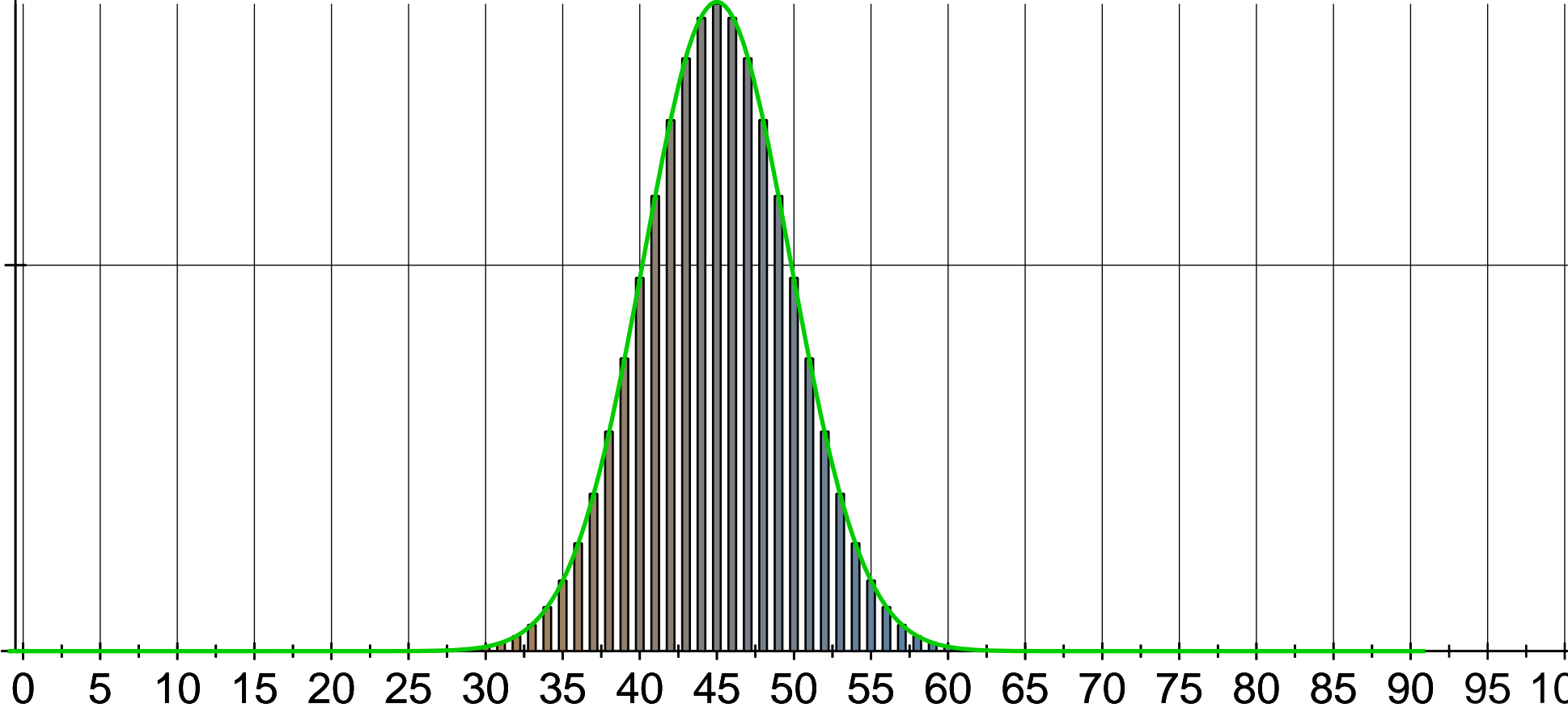
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(45.0, 4.74)$



Mathematische Statistik

Binomialverteilung

n=91 p=1/2

p

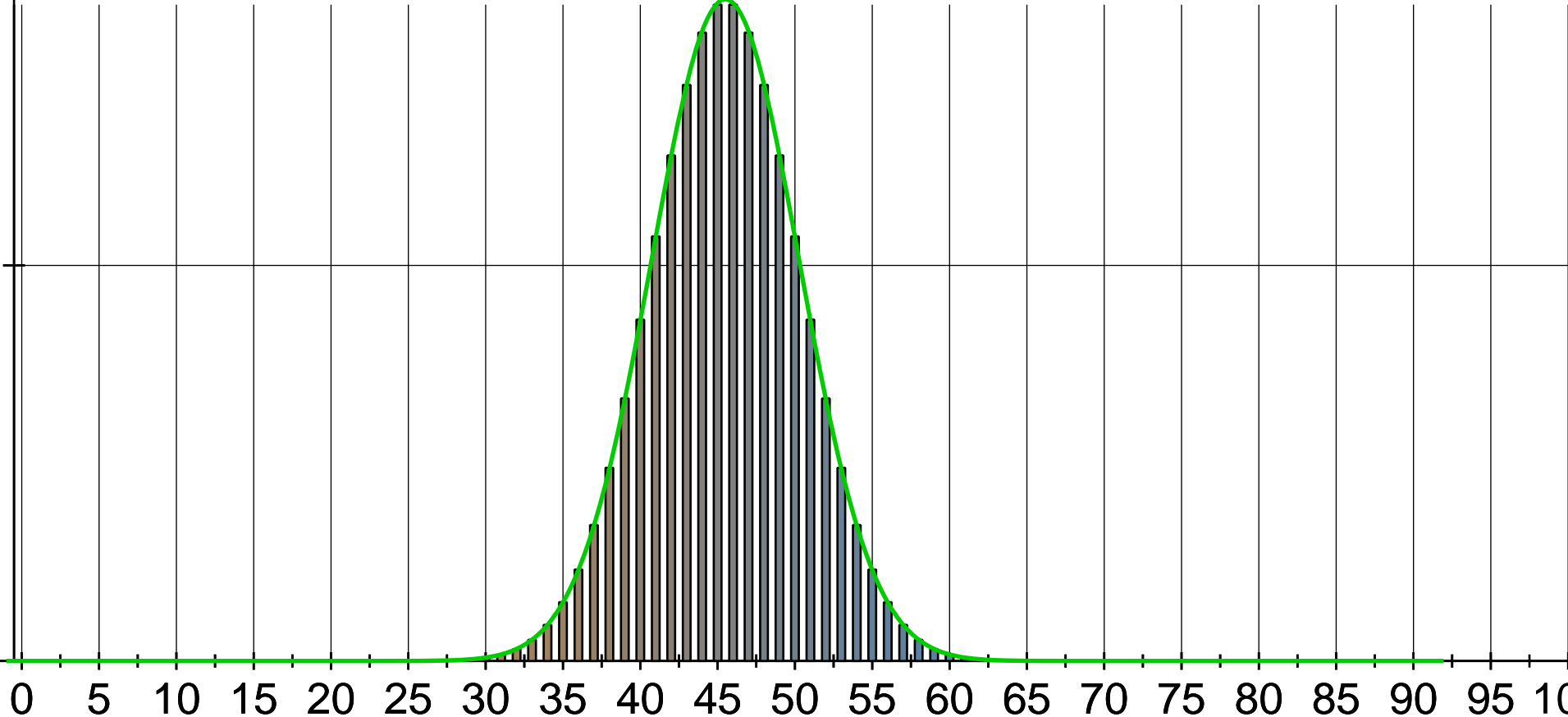
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(45.5, 4.77)$



Mathematische Statistik

Binomialverteilung

n=92 p=1/2

p

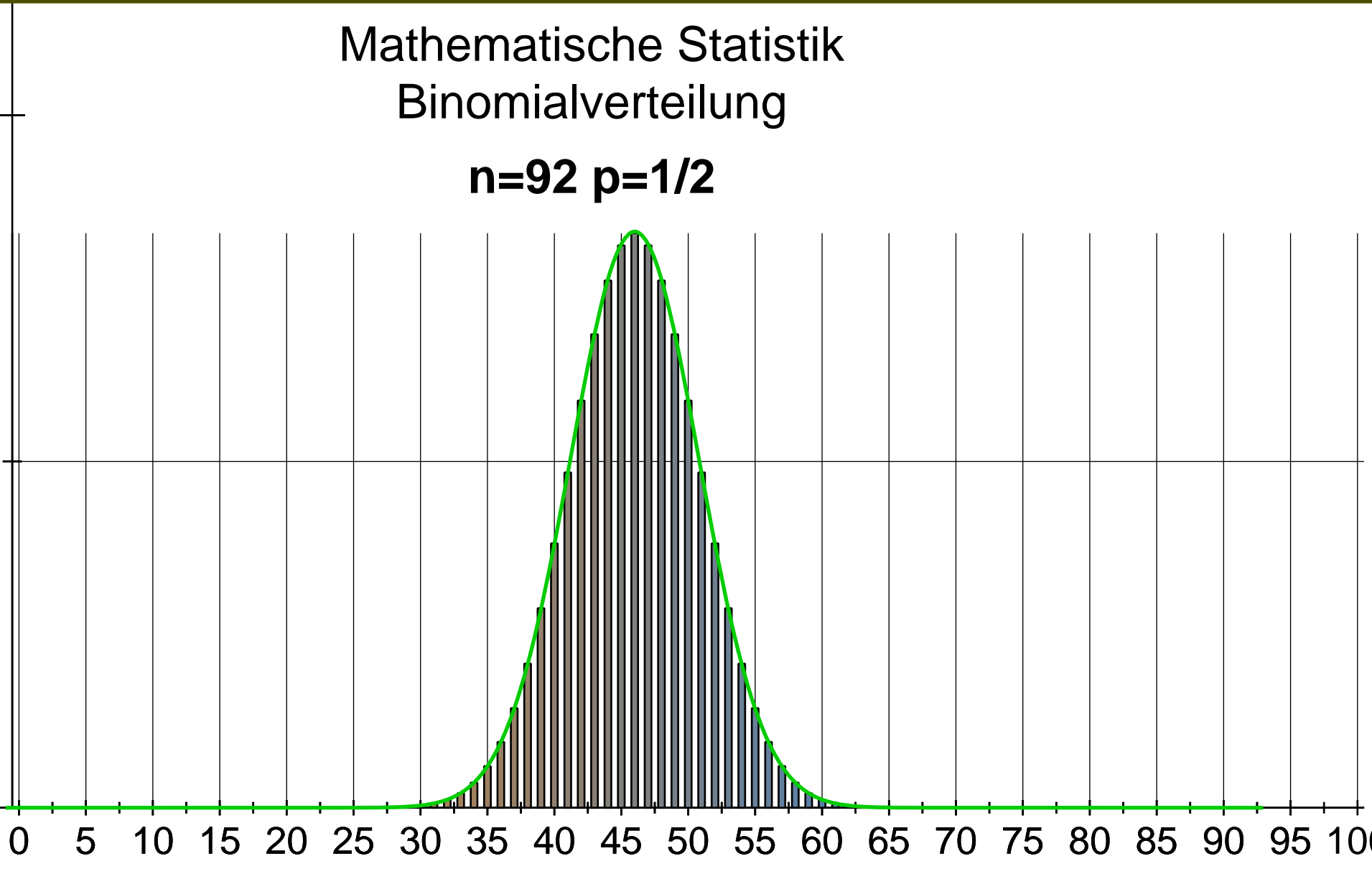
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(46.0, 4.80)$



Mathematische Statistik

Binomialverteilung

$n=93$ $p=1/2$

p

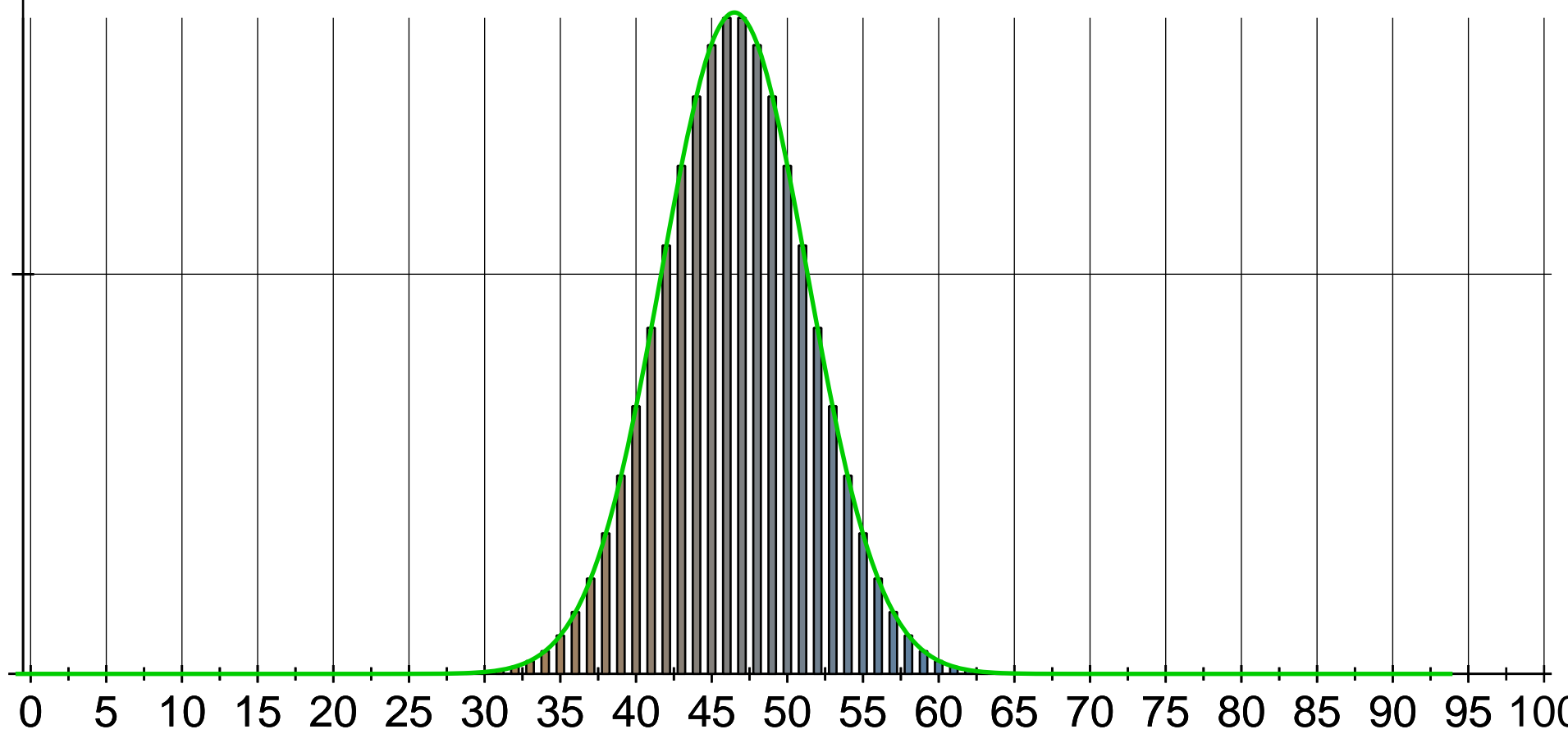
0.1

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0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(46.5, 4.82)$



Mathematische Statistik

Binomialverteilung

n=94 p=1/2

p

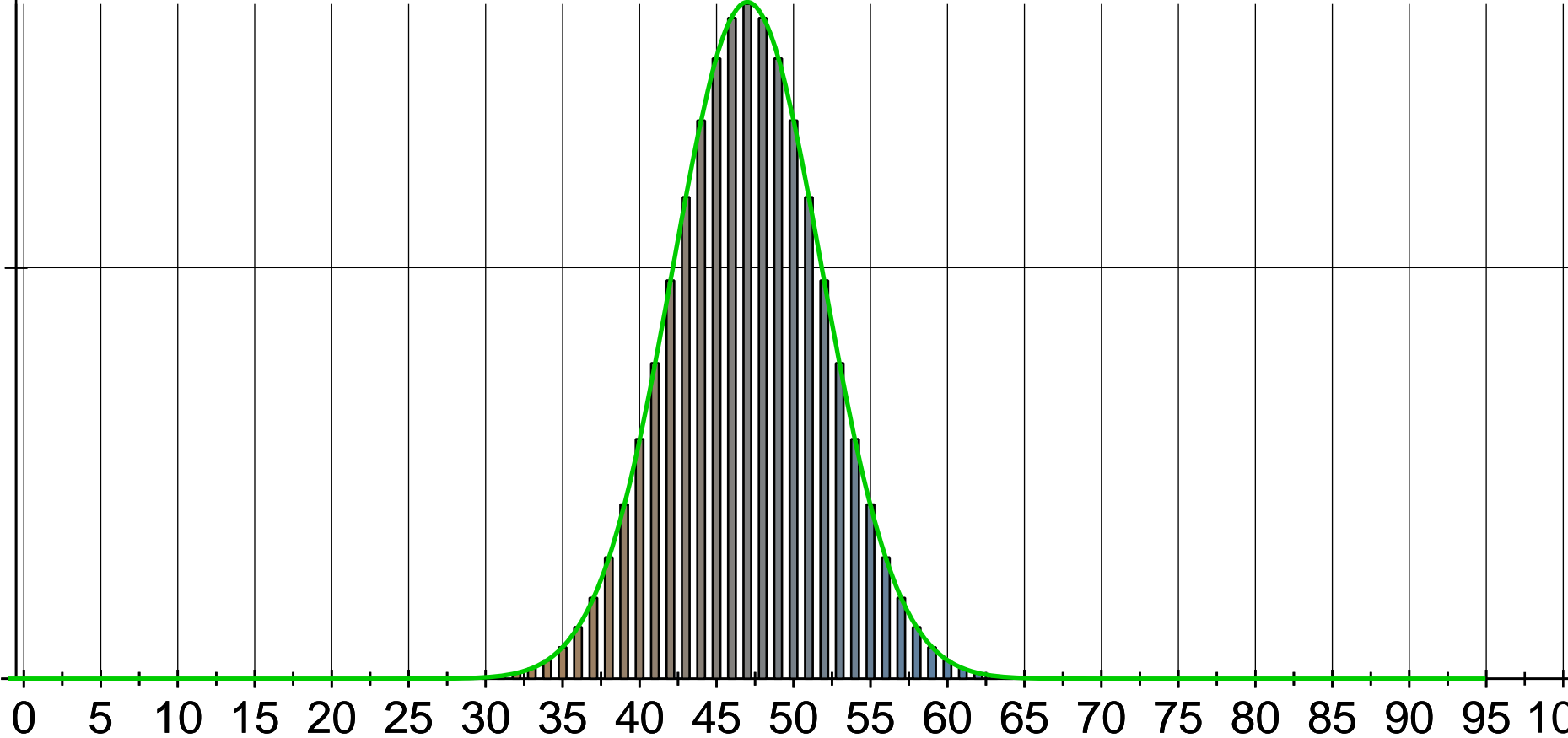
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(47.0, 4.85)$



Mathematische Statistik

Binomialverteilung

n=95 p=1/2

p

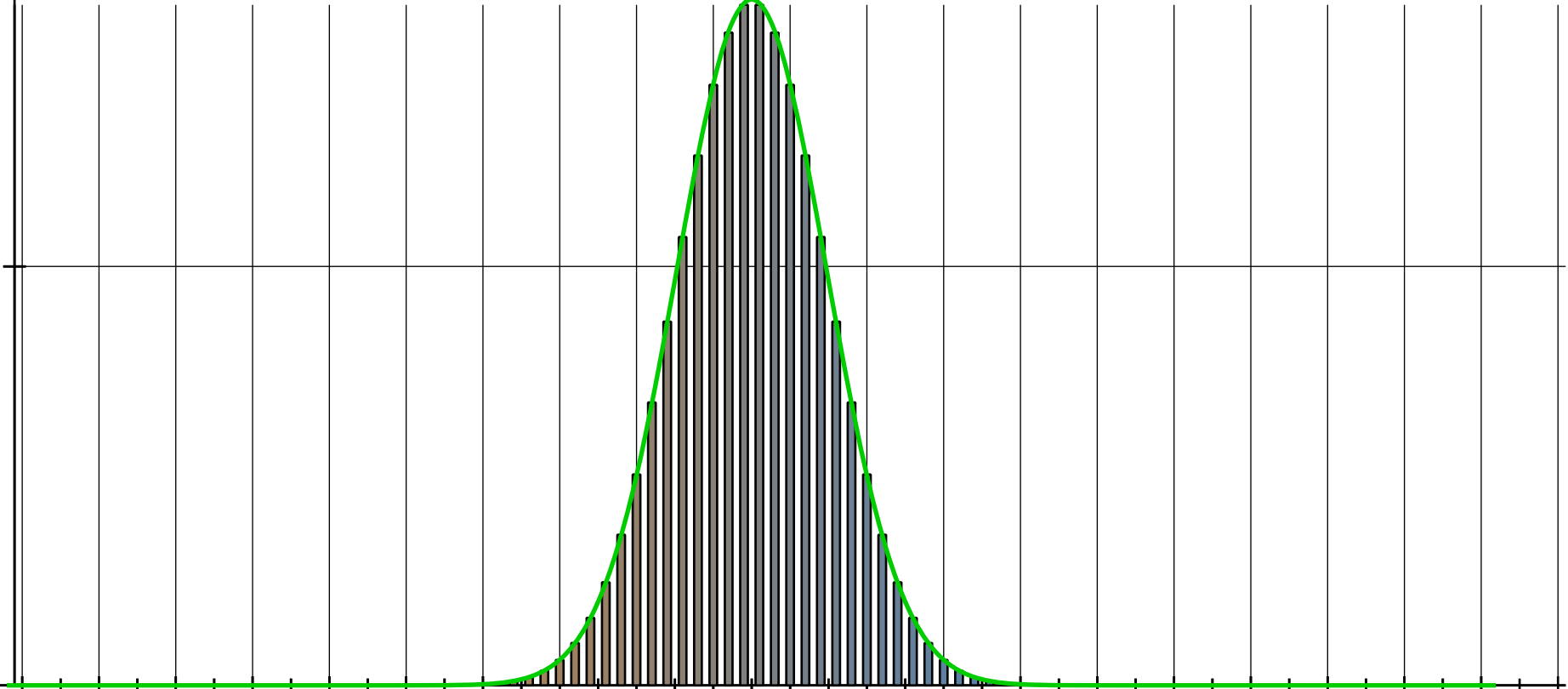
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(47.5, 4.87)$



Mathematische Statistik

Binomialverteilung

n=96 p=1/2

p

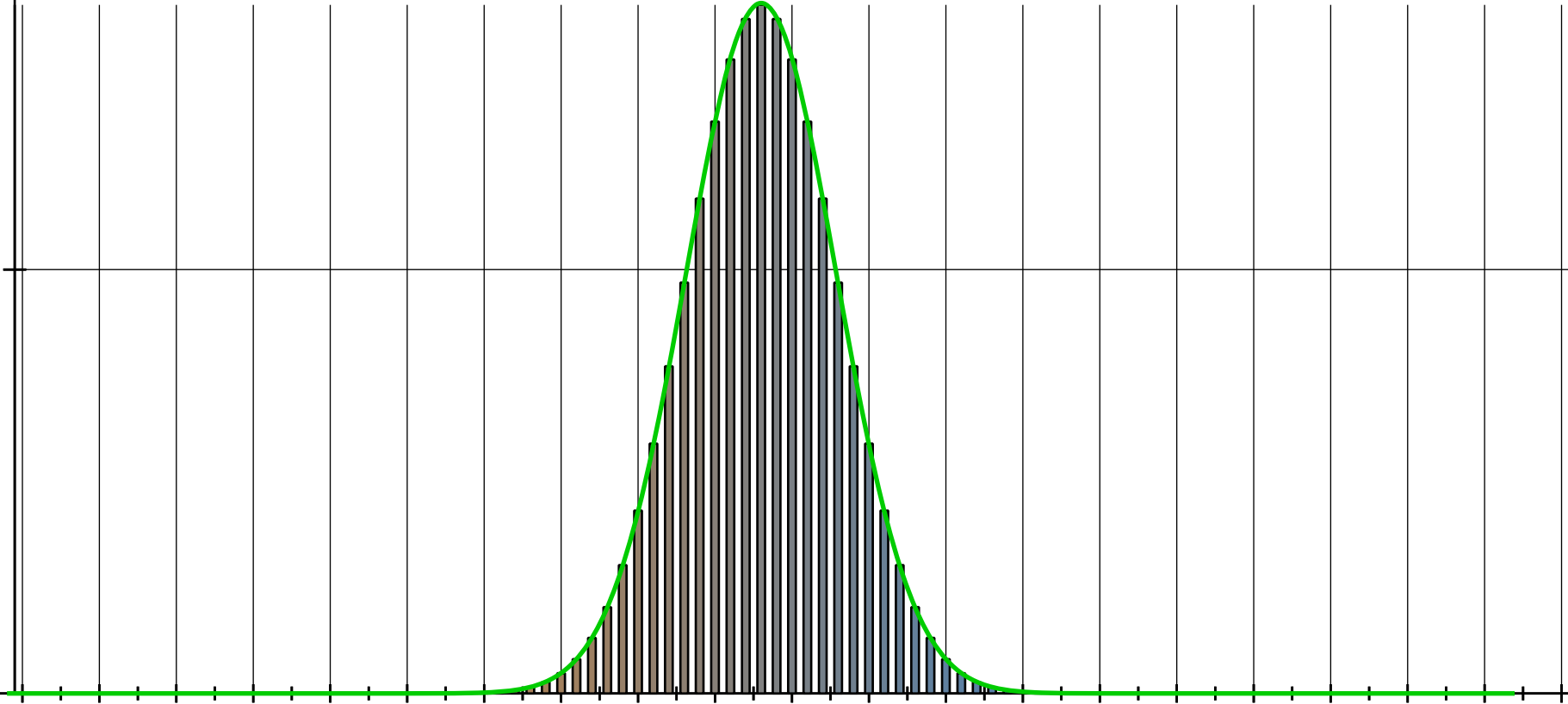
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

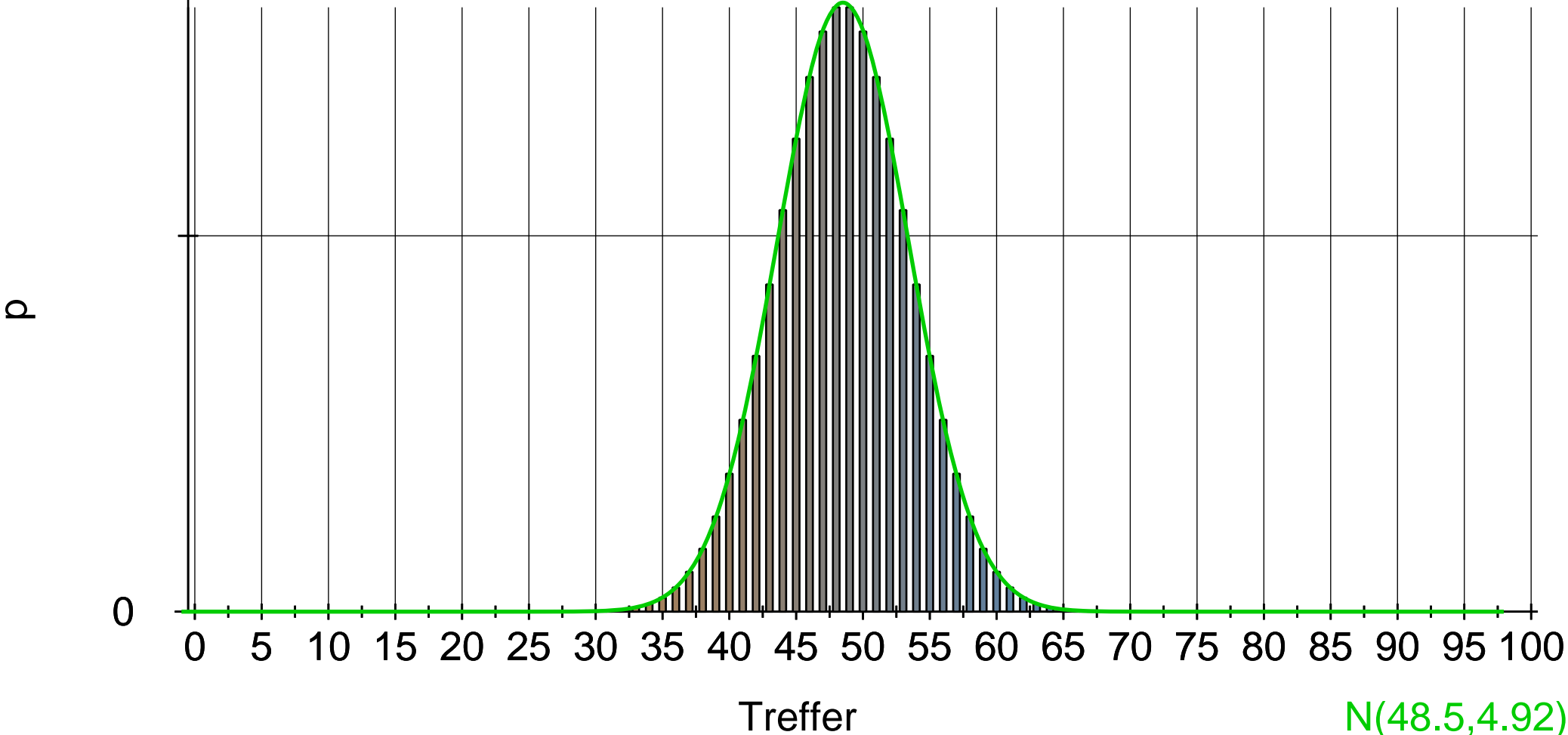
$N(48.0, 4.90)$



Mathematische Statistik

Binomialverteilung

n=97 p=1/2



$N(48.5, 4.92)$

Mathematische Statistik

Binomialverteilung

n=97 p=1/2

p

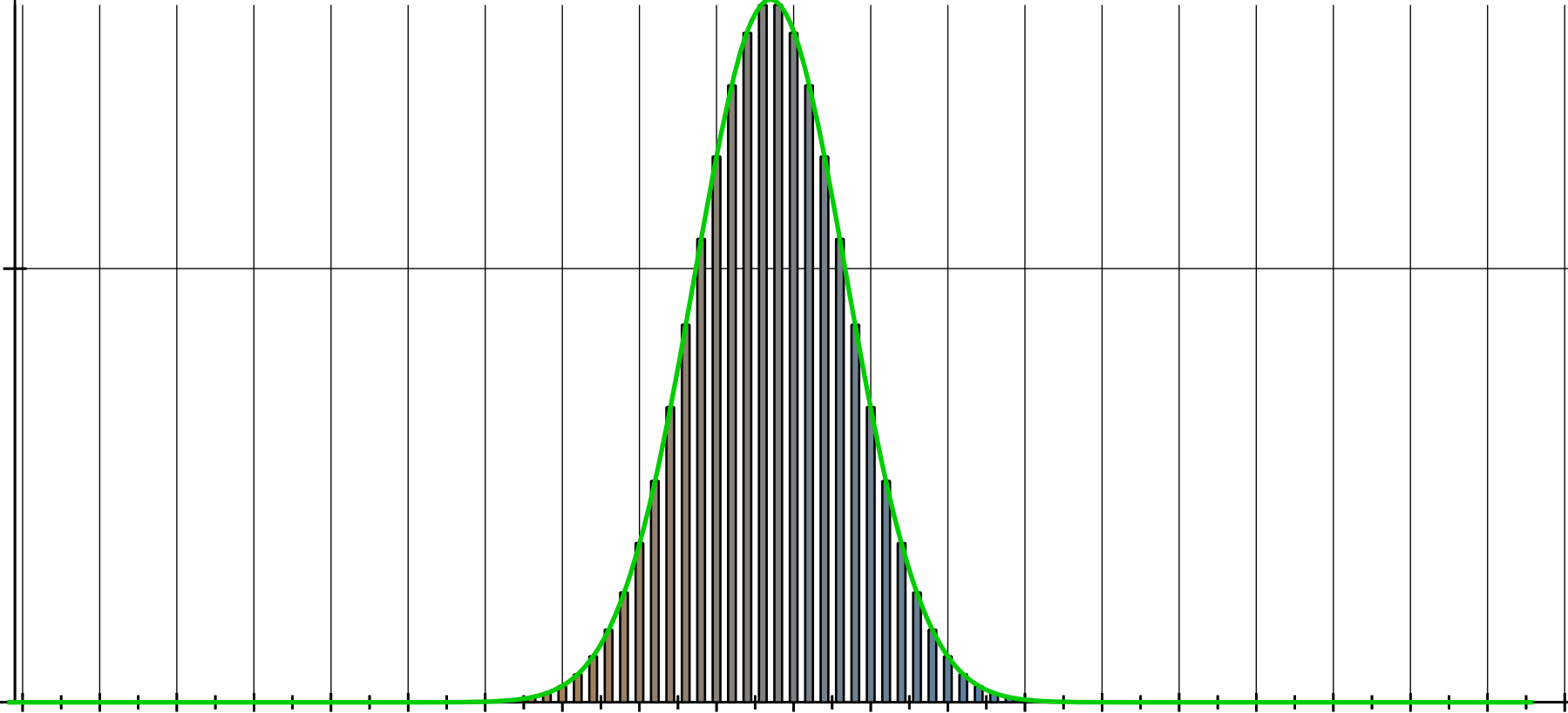
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(48.5, 4.92)$



Mathematische Statistik

Binomialverteilung

n=98 p=1/2

p

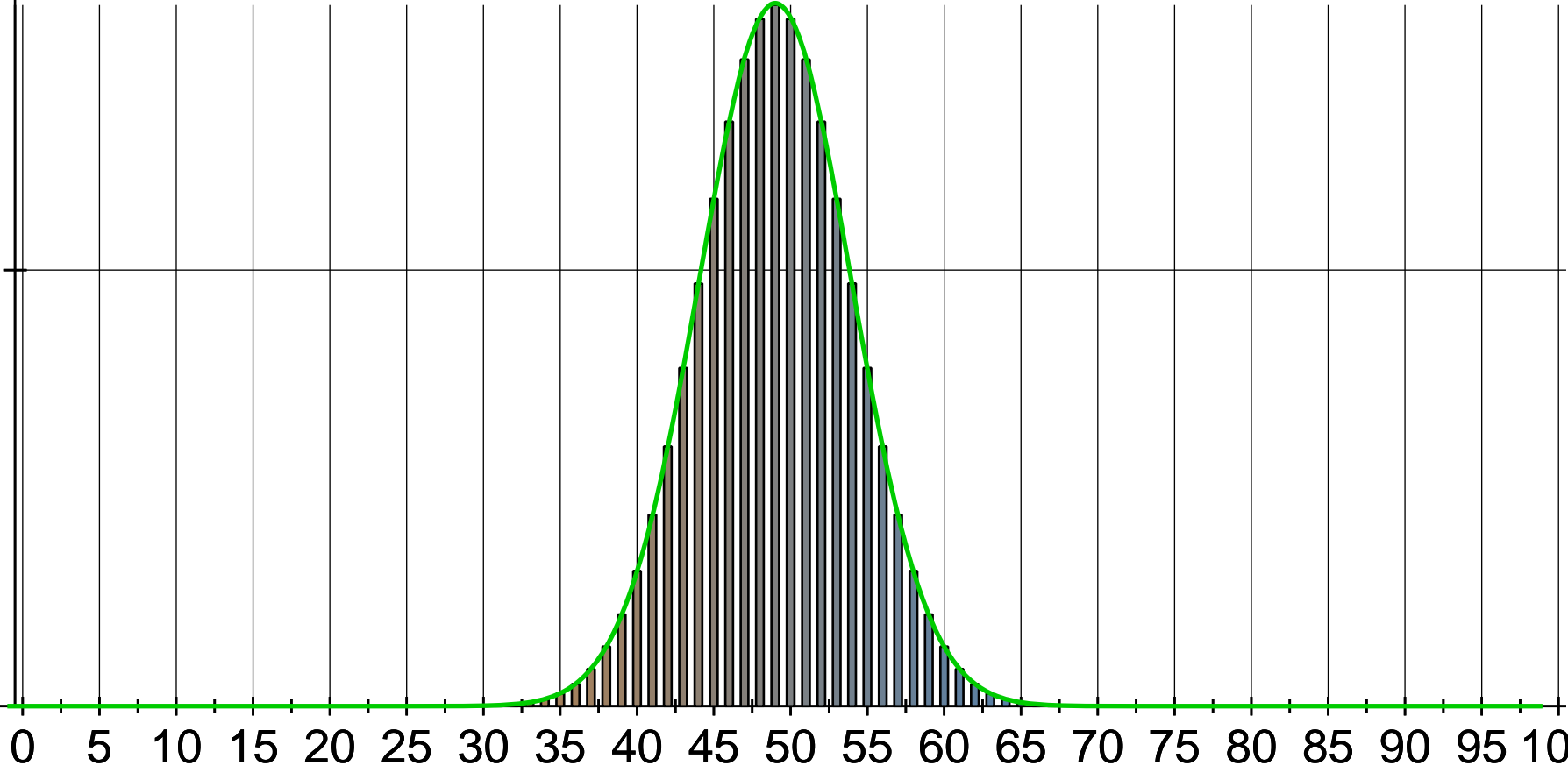
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(49.0, 4.95)$



Mathematische Statistik

Binomialverteilung

n=98 p=1/2

p

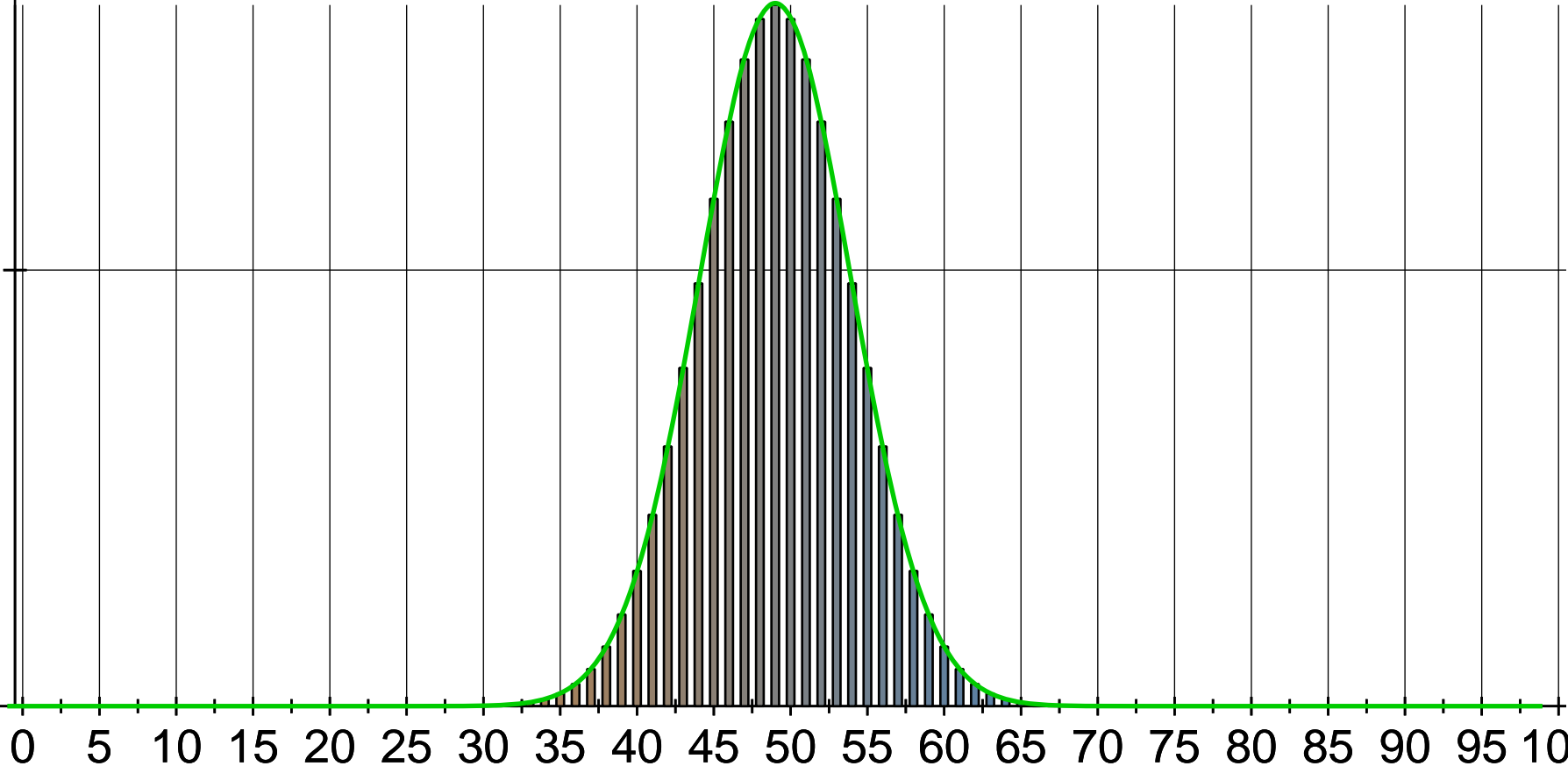
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(49.0, 4.95)$



Mathematische Statistik

Binomialverteilung

n=98 p=1/2

p

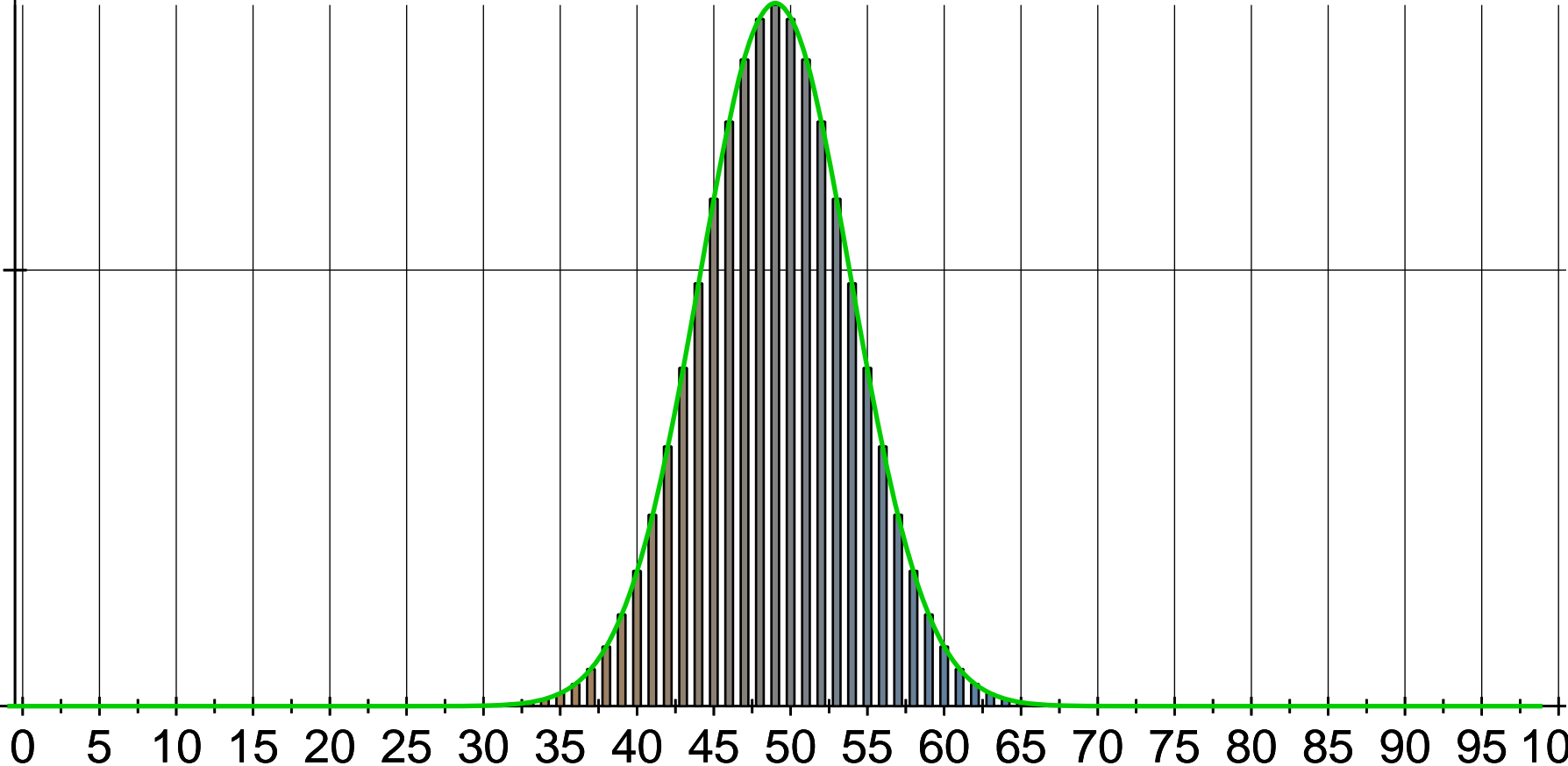
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(49.0, 4.95)$



Mathematische Statistik

Binomialverteilung

n=99 p=1/2

p

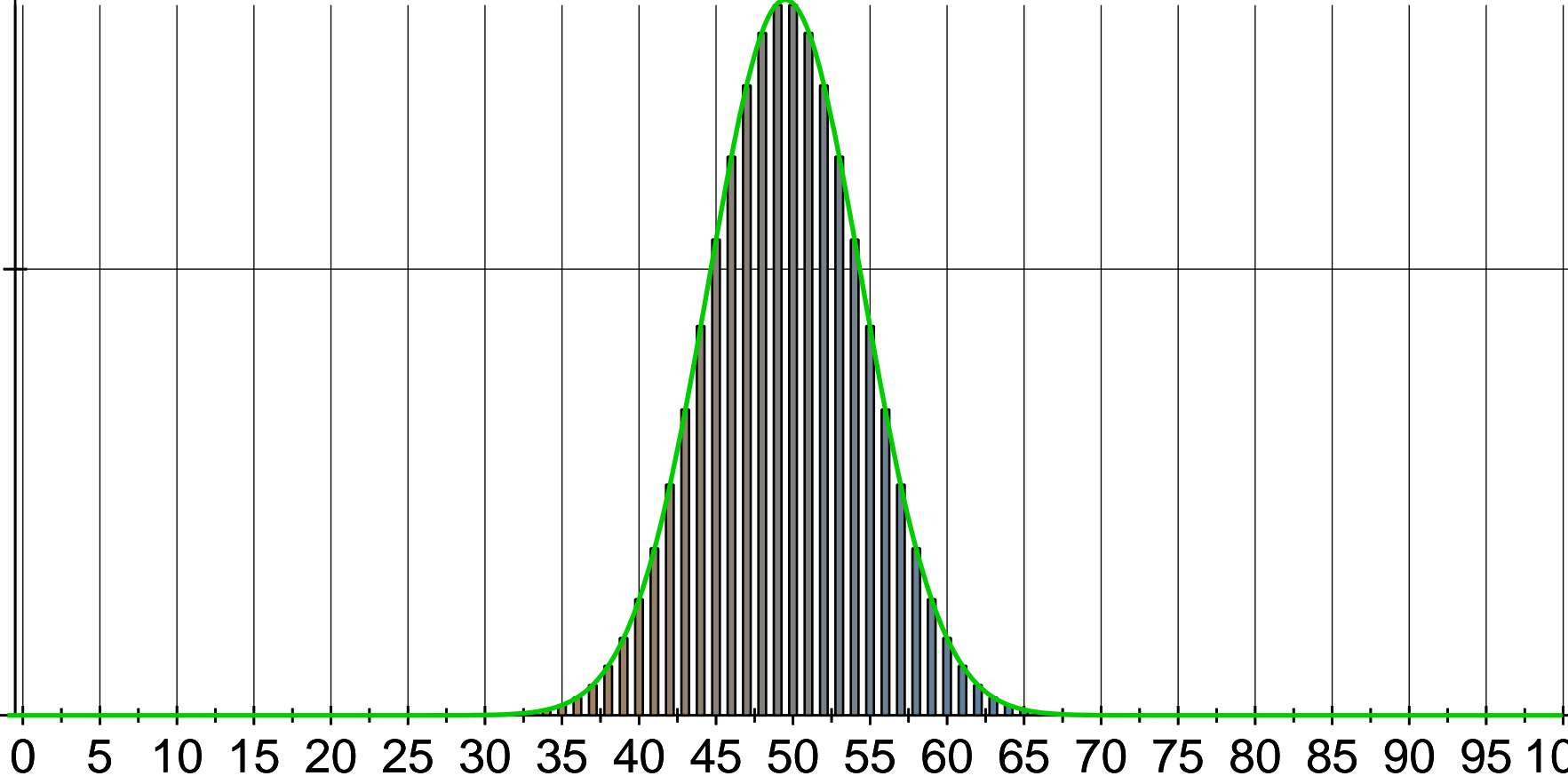
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(49.5, 4.97)$



Mathematische Statistik

Binomialverteilung

n=99 p=1/2

p

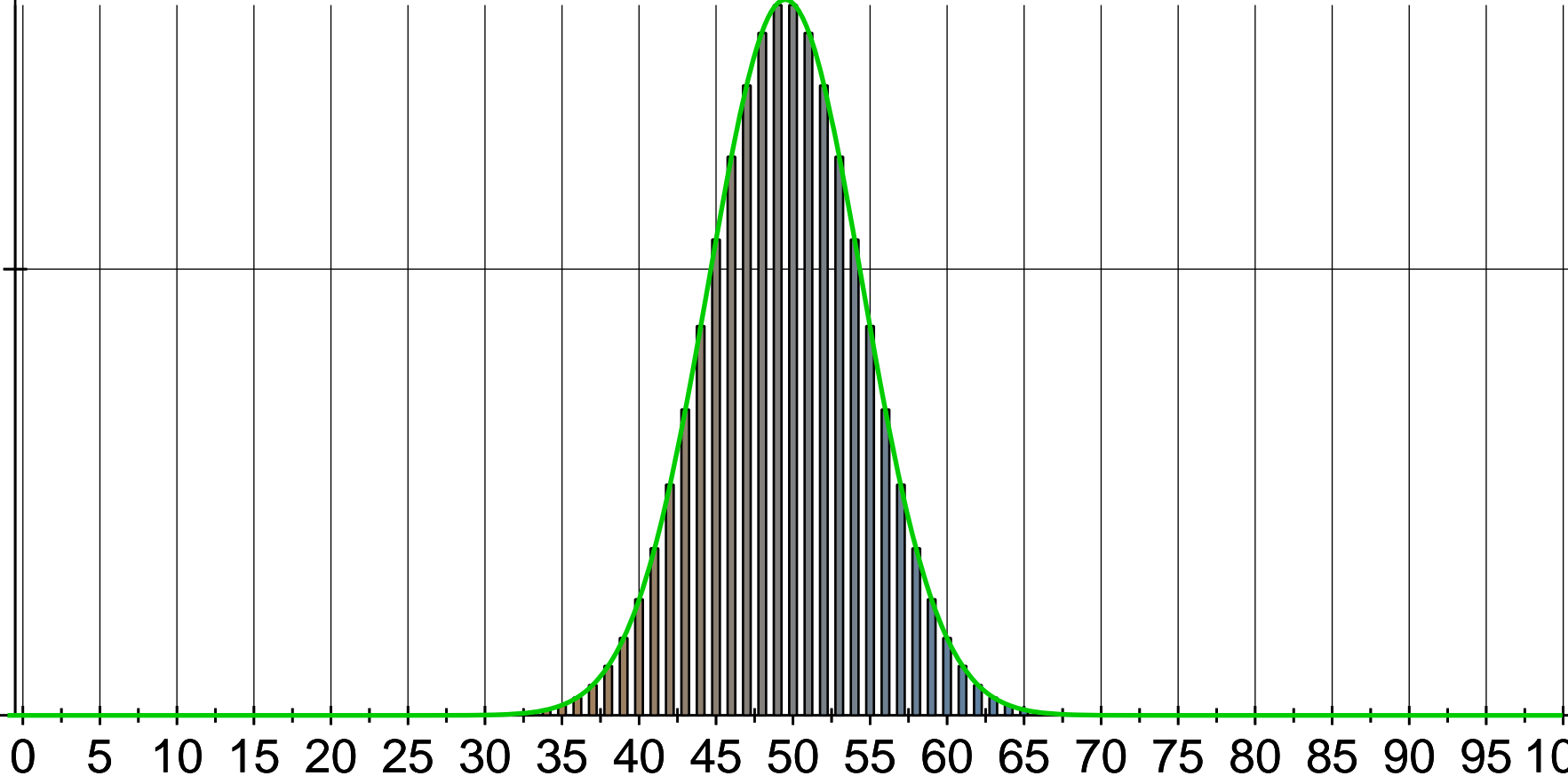
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(49.5, 4.97)$



Mathematische Statistik

Binomialverteilung

n=99 p=1/2

p

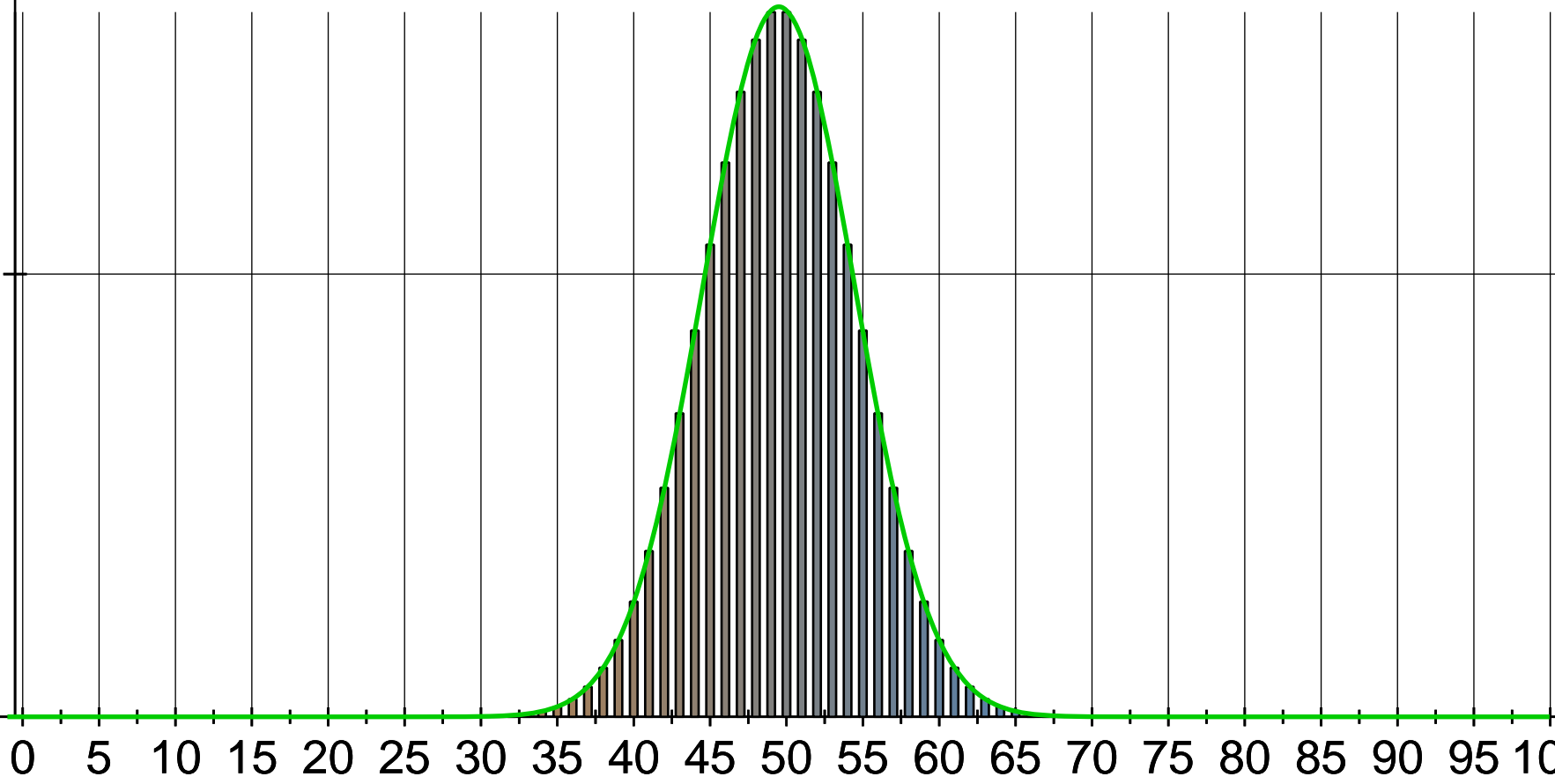
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(49.5, 4.97)$



Mathematische Statistik

Binomialverteilung

n=99 p=1/2

p

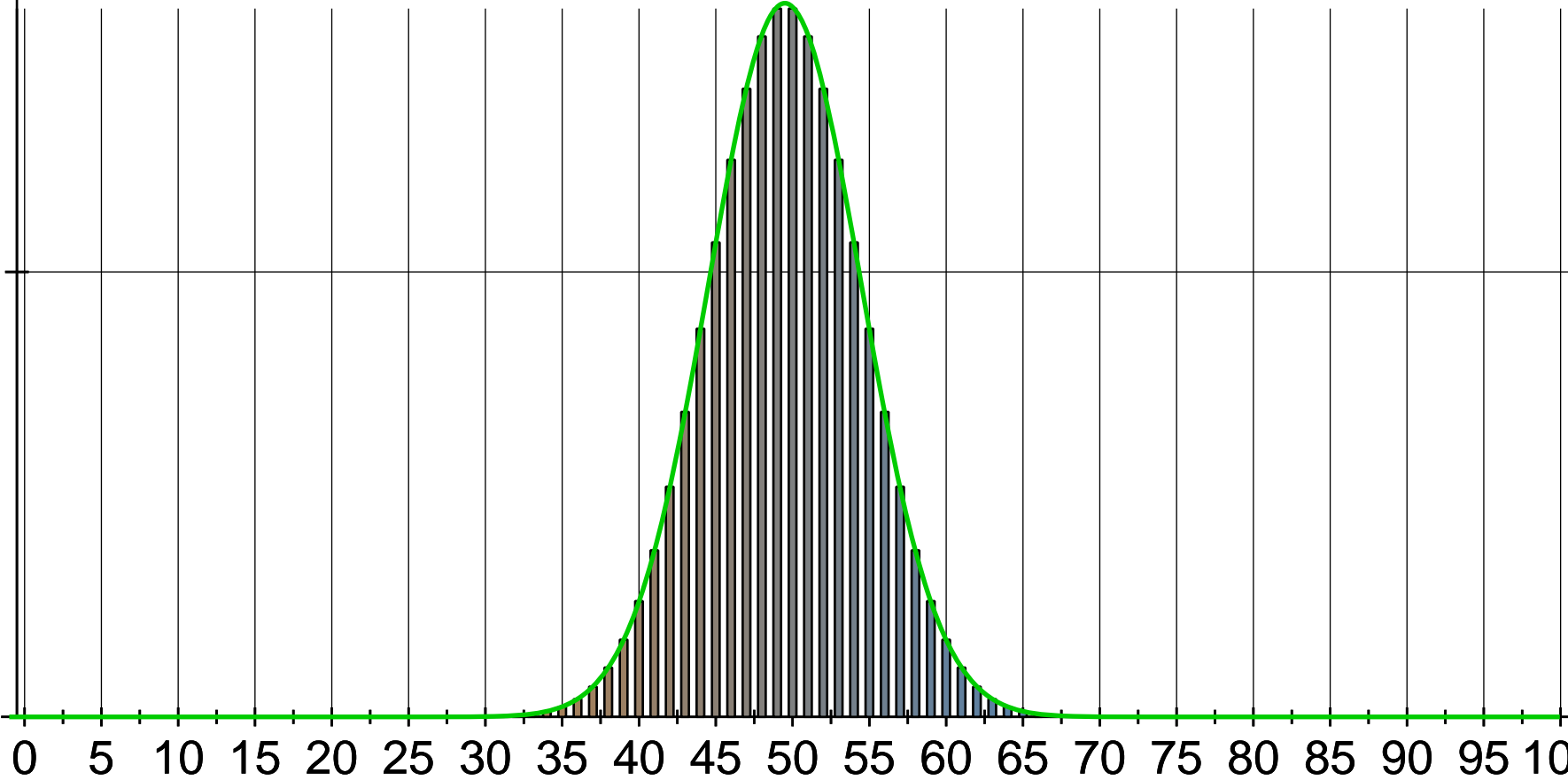
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(49.5, 4.97)$



Mathematische Statistik

Binomialverteilung

n=100 p=1/2

p

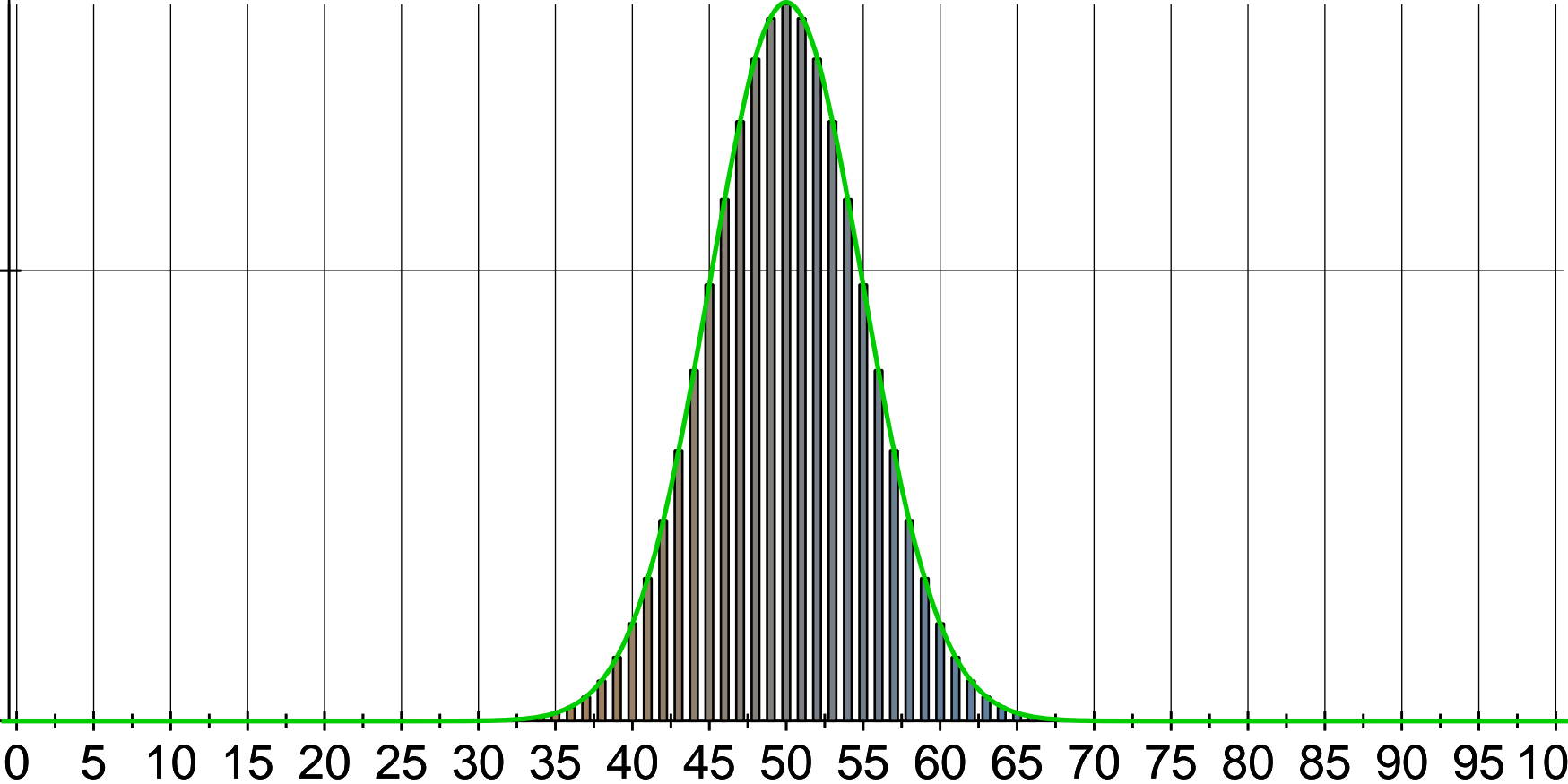
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(50.0, 5.00)$



Mathematische Statistik

Binomialverteilung

n=100 p=1/2

p

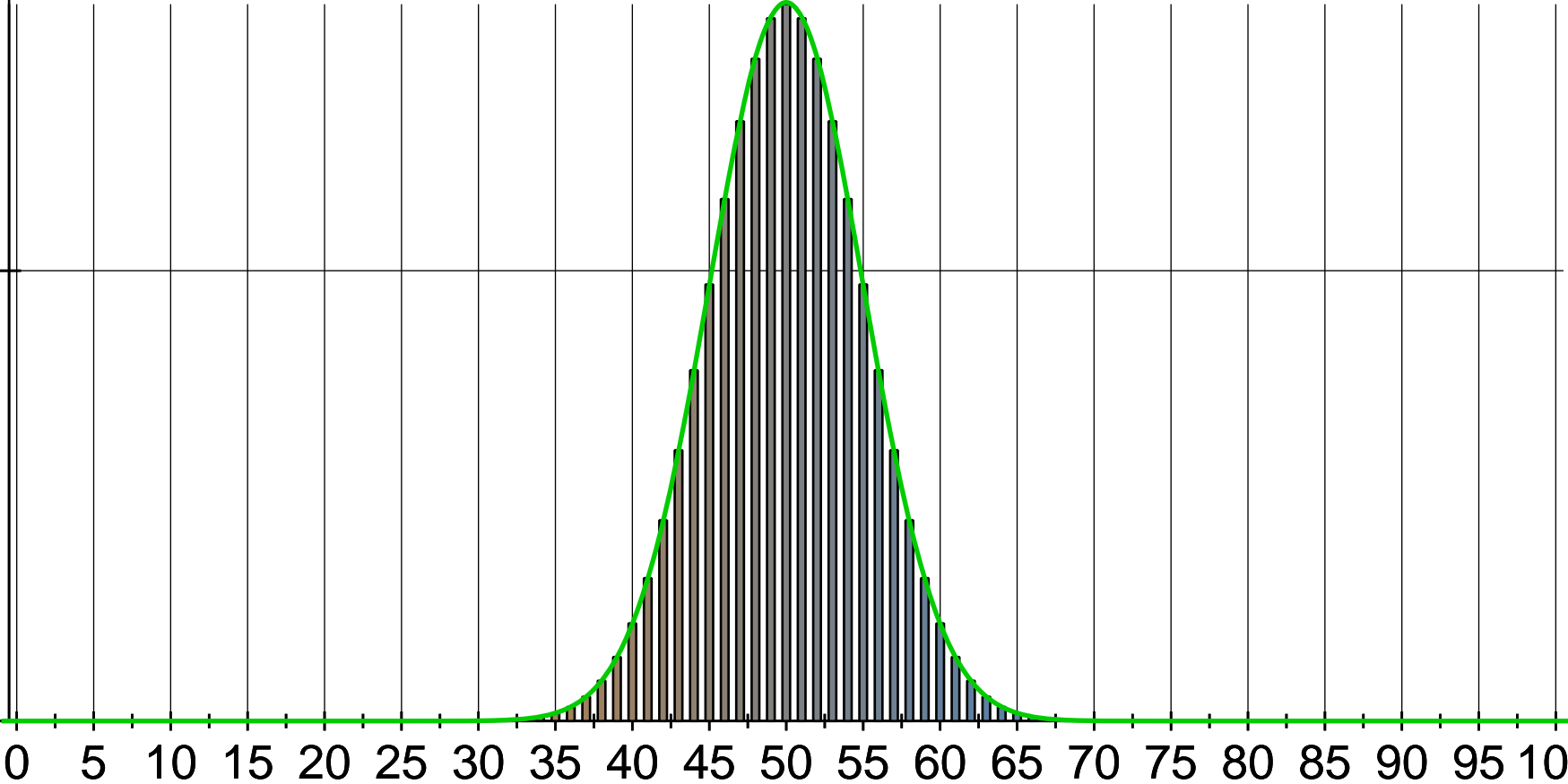
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

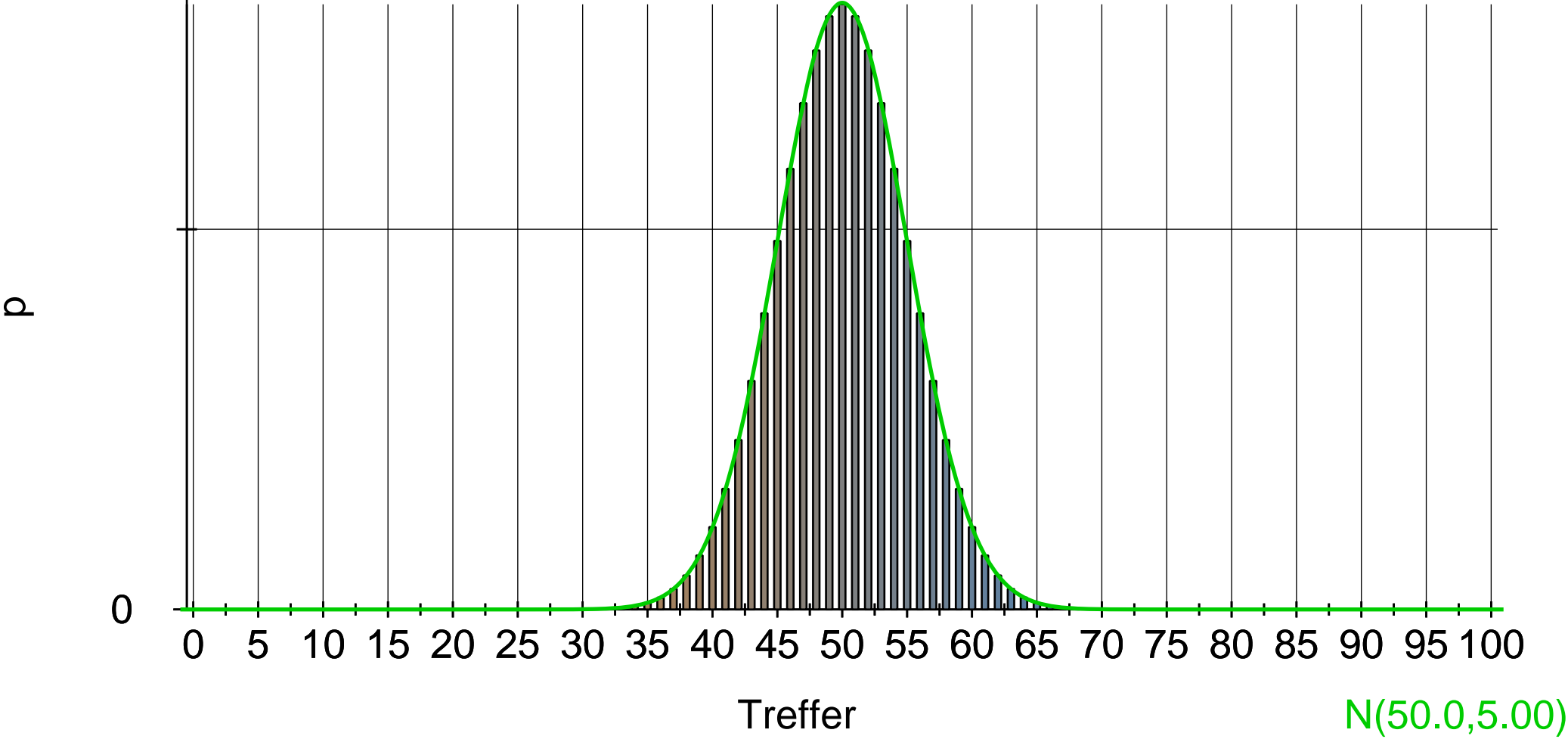
$N(50.0, 5.00)$



Mathematische Statistik

Binomialverteilung

n=100 p=1/2



Mathematische Statistik

Binomialverteilung

n=100 p=1/2

p

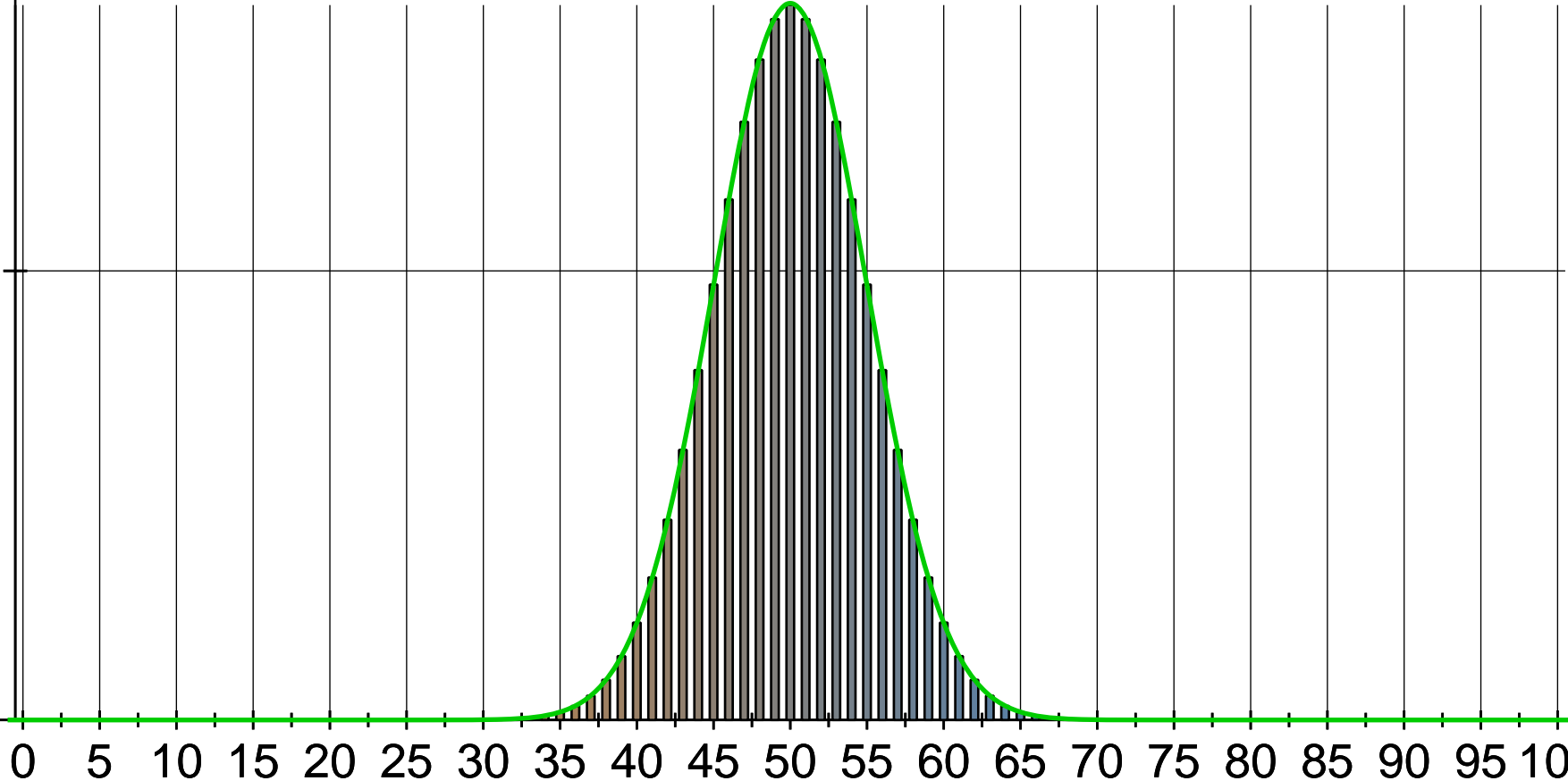
0.1

0

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Treffer

$N(50.0, 5.00)$



Mathematische Statistik

Binomialverteilung

$n=100$ $p=1/2$

