
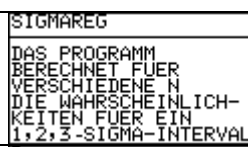
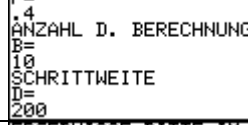
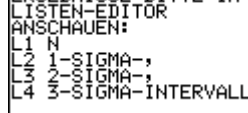


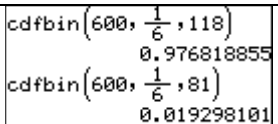
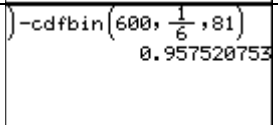
Seite 368

Detaillierte Lösungen für SHARP EL-9900G

Seite 367 Lehrtext: Sigma - Regeln

| <p>Dieses Beispiel lässt sich nicht so ohne Weiteres auf dem EL-9900G umsetzen. Mit einem kleinen Programm kann man dennoch die Screenshots aus dem Buch erhalten. Dieses Programm benutzt den Befehl <i>cdfnorm</i>, den die SchülerInnen an dieser Stelle noch nicht kennen und von dem sie auch noch nicht wissen, warum er für große Werte von n statt <i>cdfbin</i> benutzt werden darf.</p>   |  |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
|---|--|----------|----------|-------|-------|---|------|----------|----------|---|------|----------|----------|---|------|----------|----------|---|------|----------|----------|----|------|----------|----------|----|------|----------|----------|--|----|-------|-------|---|----|----------|-------|-------|---|----------|--|--|---|----------|--|--|---|----------|--|--|----|----------|--|--|----|----------|--|--|---|----------|--|--|
| <p>Das Programm <i>sigmareg.g4p</i> ist unter <a href="http://www.sharp.de/cps/rde/xbr/documents/documents/Service_Information/Software/Sigma_Regeln.zip">http://www.sharp.de/cps/rde/xbr/documents/documents/Service_Information/Software/Sigma_Regeln.zip</a> herunterzuladen und mit dem PC-Link auf den GTR zu übertragen. Ist das Programm auf den EL-9900G überspielt, kann es mit (PRGM) <input type="checkbox"/> A aufgerufen werden.</p> |   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| <p>Nach Aufruf von <i>SIGMAREG</i> erscheint ein Bildschirm, in dem kurz erklärt wird, was das Programm berechnet: Es bestimmt für verschiedene n die Wahrscheinlichkeiten, dass eine binomialverteilte Zufallsvariable in einem 1σ-, 2σ- oder 3σ-Intervall liegt, also <math>P(X \in [\mu - \sigma, \mu + \sigma])</math>, <math>P(X \in [\mu - 2\sigma, \mu + 2\sigma])</math> und <math>P(X \in [\mu - 3\sigma, \mu + 3\sigma])</math>.</p>    |   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| <p>Bestätigt man mit (ENTER), wird man nach einigen Variablen gefragt: der Wahrscheinlichkeit p, der Anzahl der Berechnungen B und der Schrittweite D. Geben wir B=10 und D=200 ein, werden die Wahrscheinlichkeiten für n=200, 400, 600, ..., 2000 berechnet.</p>  |    |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| <p>Wir bestätigen mit (ENTER) und erhalten die Information, dass wir die Ergebnisse im Listen-Editor anschauen sollen, wobei L1 die Werte für n, L2 <math>P(X \in [\mu - \sigma, \mu + \sigma])</math>, L3 <math>P(X \in [\mu - 2\sigma, \mu + 2\sigma])</math> und L4 <math>P(X \in [\mu - 3\sigma, \mu + 3\sigma])</math> enthalten.</p>  |   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| <p>Wir gehen also in den Listen-Editor ((STAT) <input type="checkbox"/> A) (ENTER) und schauen uns die Ergebnisse an. Bis auf geringe Abweichungen gleichen diese den Werten der Screenshots im Buch.</p>   | <table border="1"> <thead> <tr> <th>No</th> <th>1: L1</th> <th>2: L2</th> <th>3: L3</th> </tr> </thead> <tbody> <tr><td>1</td><td>200</td><td>0.68143</td><td>0.953937</td></tr> <tr><td>2</td><td>400</td><td>0.68206</td><td>0.954218</td></tr> <tr><td>3</td><td>600</td><td>0.68227</td><td>0.954312</td></tr> <tr><td>4</td><td>800</td><td>0.682374</td><td>0.954359</td></tr> <tr><td>5</td><td>1000</td><td>0.682457</td><td>0.954387</td></tr> <tr><td>6</td><td>1200</td><td>0.682479</td><td>0.954406</td></tr> <tr><td>2000</td><td></td><td></td><td></td></tr> </tbody> </table> | No       | 1: L1    | 2: L2 | 3: L3 | 1 | 200  | 0.68143  | 0.953937 | 2 | 400  | 0.68206  | 0.954218 | 3 | 600  | 0.68227  | 0.954312 | 4 | 800  | 0.682374 | 0.954359 | 5  | 1000 | 0.682457 | 0.954387 | 6  | 1200 | 0.682479 | 0.954406 | 2000   |    |       |       | <table border="1"> <thead> <tr> <th>No</th> <th>4: L4</th> <th>5: L5</th> <th>6: L6</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.997231</td><td></td><td></td></tr> <tr><td>2</td><td>0.997266</td><td></td><td></td></tr> <tr><td>3</td><td>0.997277</td><td></td><td></td></tr> <tr><td>4</td><td>0.997283</td><td></td><td></td></tr> <tr><td>5</td><td>0.997286</td><td></td><td></td></tr> <tr><td>6</td><td>0.997289</td><td></td><td></td></tr> </tbody> </table> | No | 4: L4    | 5: L5 | 6: L6 | 1 | 0.997231 |  |  | 2 | 0.997266 |  |  | 3 | 0.997277 |  |  | 4  | 0.997283 |  |  | 5  | 0.997286 |  |  | 6 | 0.997289 |  |  |
| No  | 1: L1  | 2: L2    | 3: L3    |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 1   | 200  | 0.68143  | 0.953937 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 2   | 400  | 0.68206  | 0.954218 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 3   | 600  | 0.68227  | 0.954312 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 4   | 800  | 0.682374 | 0.954359 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 5   | 1000   | 0.682457 | 0.954387 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 6   | 1200   | 0.682479 | 0.954406 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 2000  |  |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| No  | 4: L4  | 5: L5    | 6: L6    |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 1   | 0.997231   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 2   | 0.997266   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 3   | 0.997277   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 4   | 0.997283   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 5   | 0.997286   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 6   | 0.997289   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
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| No  | 1: L1  | 2: L2    | 3: L3    |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 6   | 1200   | 0.682479 | 0.954406 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 7   | 1400   | 0.682509 | 0.954419 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 8   | 1600   | 0.682532 | 0.954429 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 9   | 1800   | 0.682549 | 0.954437 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 10  | 2000   | 0.682563 | 0.954443 |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 11  |  |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| No  | 4: L4  | 5: L5    | 6: L6    |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 6   | 0.997289   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 7   | 0.99729  |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 8   | 0.997292   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 9   | 0.997295   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 10  | 0.997295   |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |
| 11  |  |          |          |       |       |   |      |          |          |   |      |          |          |   |      |          |          |   |      |          |          |    |      |          |          |    |      |          |          |  |    |       |       |   |    |          |       |       |   |          |  |  |   |          |  |  |   |          |  |  |    |          |  |  |    |          |  |  |   |          |  |  |

Seite 368 Beispiel

|   |  |   |
|---|--|---|
| <p>Mit dem Befehl <i>cdfbin(n,p,k)</i> ist Vorsicht geboten. Falls die Parameter für n und k zu groß sind, gibt der EL-9900G ohne Fehlermeldung als Ergebnis 0 aus. Das Ergebnis 0 muss man bei diesem Befehl also immer hinterfragen. In diesem Beispiel haben wir jedoch Glück:</p> |  |   |
| <p>Wir geben den Befehl <i>cdfbin</i> ((STAT) <input type="checkbox"/> F) <input type="checkbox"/> 1) <input type="checkbox"/> 1), gefolgt von den drei Parametern ein. Es funktioniert: Bei beiden Berechnungen erhält man Ergebnisse.</p>   |               |   |
| <p>Also kann man die Befehle wie in Fig. 4 in einer Zeile eingeben:</p>   | $\text{cdfbin}\left(600, \frac{1}{6}, 118\right) - \text{cdfbin}\left(600, \frac{1}{6}, 81\right)$ |  |