Университет ИТМО

Факультет ФПИ и КТ

### Отчёт

### ДЗ 2

# «Теория Верятности»

Вариант 12

Студент:

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Преподаватель:  
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**19.1**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | 16 | 17 | 17 | 18 | 19 | 21 | 25 | 30 | 32 |
| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 48 |
| 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 61 |
| 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 |
| 76 | 77 | 78 | 80 | 81 | 82 | 84 | 85 | 86 | 87 |
| 88 | 89 | 90 | 91 | 92 | 93 | 93 | 94 | 94 | 96 |
| 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 109 |
| 110 | 112 | 113 | 114 | 115 | 121 | 123 | 124 | 125 | 126 |
| 128 | 129 | 130 | 131 | 135 | 137 | 138 | 139 | 140 | 141 |
| 142 | 144 | 145 | 146 | 147 | 149 | 150 | 151 | 158 | 159 |

Б)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Номер  Частичного интерваола | Границы интервала | Средина интервала | Частота интерваола | Относительная частота | Плотность относительной частоты |
| 1 | 15-31 | 23 | 9 | 0.09 | 0.005625 |
| 2 | 31-47 | 39 | 10 | 0.1 | 0.00625 |
| 3 | 47-63 | 55 | 11 | 0.11 | 0.006875 |
| 4 | 63-79 | 71 | 13 | 0.13 | 0.008125 |
| 5 | 79-95 | 87 | 16 | 0.16 | 0.01 |
| 6 | 95-111 | 103 | 12 | 0.12 | 0.0075 |
| 7 | 111-127 | 119 | 9 | 0.09 | 0.005625 |
| 8 | 127-143 | 135 | 11 | 0.11 | 0.006875 |
| 9 | 143-159 | 151 | 9 | 0.09 | 0.005625 |
| Sum |  |  | 100 |  |  |

в) Строим поли­он частот и ­исто­рамм‑ относительных

частот

图表, 折线图

描述已自动生成

图表, 折线图

描述已自动生成

图表, 折线图

描述已自动生成

Г)

Выброчное среднее:

Выборочная дисперсия:

Исправленная дисперсия:

Д)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| i | Границы  интервала | |  |  | Границы интервала | |
|
|  |  |  |  |
|
| 1 | 15 | 31 | - | -55.68 | - | -1.44 |
| 2 | 31 | 47 | -55.68 | -39.68 | -1.44 | -1.03 |
| 3 | 47 | 63 | -39.68 | -23.68 | -1.03 | -0.61 |
| 4 | 63 | 79 | -23.68 | -7.68 | -0.61 | -0.2 |
| 5 | 79 | 95 | -7.68 | 8.32 | -0.2 | 0.22 |
| 6 | 95 | 111 | 8.32 | 24.32 | 0.22 | 0.63 |
| 7 | 111 | 127 | 24.32 | 40.32 | 0.63 | 1.04 |
| 8 | 127 | 143 | 40.32 | 56.32 | 1.04 | 1.46 |
| 9 | 143 | 159 | 56.32 | - | 1.46 | - |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| i | Границаы Интервала | |  |  |  |  |
|  |  |
| 1 | - | -1.44 | -0.5 | -0.4251 | 0.0749 | 7.49 |
| 2 | -1.44 | -1.03 | -0.4251 | -0.3485 | 0.0766 | 7.66 |
| 3 | -1.03 | -0.61 | -0.3485 | -0.2291 | 0.1194 | 11.94 |
| 4 | -0.61 | -0.2 | -0.2291 | -0.0793 | 0.1498 | 14.98 |
| 5 | -0.2 | 0.22 | -0.0793 | 0.0871 | 0.1664 | 16.64 |
| 6 | 0.22 | 0.63 | 0.0871 | 0.2357 | 0.1486 | 14.86 |
| 7 | 0.63 | 1.04 | 0.2357 | 0.3508 | 0.1151 | 11.51 |
| 8 | 1.04 | 1.46 | 0.3508 | 0.4279 | 0.0771 | 7.71 |
| 9 | 1.46 | - | 0.4279 | 0.5 | 0.0721 | 7.21 |
| SUM |  |  |  |  | 1 | 100 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| i |  |  |  |  |  |  |  |
| 1 | 9 | 7.49 | 1.51 | 2.2801 | 0.304419 | 81 | 10.81442 |
| 2 | 10 | 7.66 | 2.34 | 5.4756 | 0.71483 | 100 | 13.05483 |
| 3 | 11 | 11.94 | -0.94 | 0.8836 | 0.074003 | 121 | 10.134 |
| 4 | 13 | 14.98 | -1.98 | 3.9204 | 0.261709 | 169 | 11.28171 |
| 5 | 16 | 16.64 | -0.64 | 0.4096 | 0.024615 | 256 | 15.38462 |
| 6 | 12 | 14.86 | -2.86 | 8.1796 | 0.550444 | 144 | 9.690444 |
| 7 | 9 | 11.51 | -2.51 | 6.3001 | 0.547359 | 81 | 7.037359 |
| 8 | 11 | 7.71 | 3.29 | 10.8241 | 1.403904 | 121 | 15.6939 |
| 9 | 9 | 7.21 | 1.79 | 3.2041 | 0.444397 | 81 | 11.2344 |
| sum | 100 | 100 |  |  |  |  | 104.3257 |

При таблице критических точек распределения , уровню значимости a=0.01 и число степеней свободы k=9-3=6 .

, то ­гипотеза о нормальном распределении ­енеральной совокупности принимается.

Е)

доверительный интервала для а будет (94.55645299;79.98354701),при δ=7,69.

При n=100, имеем q=0.143. Доверительным интервалом для ,будет (33.2453,44.3399)

**19.2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | j | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| i | y  x | 110 | 130 | 150 | 170 | 190 | 210 | 230 | 250 |  |  |  |  |
| 1 | 10 | 1 | 3 | 4 |  |  |  |  |  | 8 | 80 | 800 | 11000 |
| 2 | 13 |  | 5 | 6 | 5 |  |  |  |  | 16 | 208 | 2704 | 31200 |
| 3 | 16 |  |  | 4 | 8 | 6 |  |  |  | 18 | 288 | 4608 | 49600 |
| 4 | 19 |  |  | 6 | 15 | 9 |  |  |  | 30 | 570 | 10830 | 98040 |
| 5 | 22 |  |  |  |  | 5 | 6 | 7 |  | 18 | 396 | 8712 | 84040 |
| 6 | 25 |  |  |  |  |  | 1 | 7 | 2 | 10 | 250 | 6250 | 58000 |
| 7 |  | 1 | 8 | 20 | 28 | 20 | 7 | 14 | 2 | 100 | 1792 | 33904 | 331880 |
| 8 |  | 110 | 1040 | 3000 | 4760 | 3800 | 1470 | 3220 | 500 | 17900 | - |  |  |
| 9 |  | 12100 | 135200 | 450000 | 809200 | 722000 | 308700 | 740600 | 125000 | 3302800 |  |  |  |
| 10 |  | 1100 | 12350 | 44400 | 81260 | 71630 | 32970 | 75670 | 12500 | 331880 |  |  |  |

