Industrial Management – Homework 1

(LP 12 3)

**Data:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year (t)** | **Xt(tones)** | **DXt=Xt+1-Xt** | **Dt=DXt/Xt** | **Xt2** | **K/Xt-1** | **ln(K/Xt-1)** |
| **Actual Production** | | | | | | |
| 1 | 4 | 1,27 | 0,3175 | 16 | 14,52162 | 2,675639 |
| 2 | 5,27 | 1,49 | 0,282732448 | 27,7729 | 10,7811158 | 2,377796 |
| 3 | 6,76 | 2,61 | 0,386094675 | 45,6976 | 8,18439055 | 2,102229 |
| 4 | 9,37 | 2,63 | 0,280683031 | 87,7969 | 5,62609179 | 1,727415 |
| 5 | 12 | 3,8 | 0,316666667 | 144 | 4,17387334 | 1,428844 |
| 6 | 15,8 | 3,7 | 0,234177215 | 249,64 | 2,92952406 | 1,07484 |
| 7 | 19,5 | 4,5 | 0,230769231 | 380,25 | 2,18392206 | 0,781122 |
| 8 | 24 | 5,6 | 0,233333333 | 576 | 1,58693667 | 0,461806 |
| 9 | 29,6 | 5,38 | 0,181756757 | 876,16 | 1,09751622 | 0,09305 |
| 10 | 34,98 | - | - | - | 0,77491367 | -0,255 |
| **Sums** | **126,3** | **30,98** | **2,463713356** | **2403,3174** | **51,8599041** | **12,46774** |

1. **Production Dynamics Graph**
2. **a, b, K**

|  |  |  |
| --- | --- | --- |
| **Logistic coefficient** | q | -0,00569673 |
| **Growth Rate parameter** | b | 0,353690076 |
| **Saturation limit** | K | 62,0864801 |
|  | a | 3,192069093 |

1. **Correctness**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year (t)** | **Actual Production** | **Computed Production** | **Deviation** |
| **Correctness Check** | | | |
| 1 | 4 | 3,432459657 | -14,1885 |
| 2 | 5,27 | 4,776842944 | -9,35782 |
| 3 | 6,76 | 6,588629894 | -2,53506 |
| 4 | 9,37 | 8,979925382 | -4,16302 |
| 5 | 12 | 12,05066979 | 0,422248 |
| 6 | 15,8 | 15,85792112 | 0,366589 |
| 7 | 19,5 | 20,37813717 | 4,503268 |
| 8 | 24 | 25,47673947 | 6,153081 |
| 9 | 29,6 | 30,90574411 | 4,411298 |
| 10 | 34,98 | 36,34317254 | 3,897006 |
| **Deviation Average:** | | | -1,04909 |

1. **Production Forecast**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Predicted Production** | | | | | | |
| 11 | 41,46507302 | 4,553388971 | 0,109812636 | 1719,352281 | 0,49731993 | -0,69852 |
| 12 | 46,01846199 | 3,844354939 | 0,083539405 | 2117,698844 | 0,3491646 | -1,05221 |
| 13 | 49,86281693 | 3,10679442 | 0,062306837 | 2486,300512 | 0,24514586 | -1,4059 |
| 14 | 52,96961135 | - | - | - | 0,17211508 | -1,75959 |
| **Sums** | **190,3159633** | **11,50453833** | **0,255658878** | **6323,351637** | **1,26374547** | **-4,91623** |