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Mathematical Modeling

2/18/16

**Computer Project #2**

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| --- | --- |
| **Linear Immigration/Migration/Harvesting Model:** | **Normal Equations** |
| Pn+1= 0.467Pn + 1.367 | 209.28465r + 39.52k = 152.091 |
|  | 39.52r + 10k = 32.14 |

**Part A**

|  |  |
| --- | --- |
| **n** | **Pn** |
| 0 | 10000 |
| 1 | 6500 |
| 2 | 3550 |
| 3 | 3250 |
| 4 | 2800 |
| 5 | 2750 |
| 6 | 2720 |
| 7 | 2675 |
| 8 | 2650 |
| 9 | 2625 |
| 10 | 2620 |

|  |  |
| --- | --- |
| **Pn** | **Pn+1** |
| 10 | 6.5 |
| 6.5 | 3.55 |
| 3.55 | 3.25 |
| 3.25 | 2.8 |
| 2.8 | 2.75 |
| 2.75 | 2.72 |
| 2.72 | 2.675 |
| 2.675 | 2.65 |
| 2.65 | 2.625 |
| 2.625 | 2.62 |

**Part B**

**Sums**

xi= 39.52

yi= 32.14

xiyi= 152.091

xi2= 209.28465

**Algebraic Solution**

r ∑ xi2 + k ∑ xi = ∑ xiyi r ∑ xi + Nk = ∑ yi

209.28465r + 39.52k = 152.091 39.52r + 10k = 32.14

k= 3.214 – 3.952m

209.28465r + 39.52(3.214 – 3.952r) = 152.091

r= 0.467

k= 3.214 – 3.952(0.467)= 1.367

**Pn+1= 0.467Pn + 1.367**