**RMark exercise #2 Answers:** R code is in demo.r

1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Survival | 0.732 | 0.876 | 0.690 | 0.533 \*\* |  |
| Capture |  | 0.504 | 0.363 | 0.518 | 0.412 \*\* |

The capture probability for time 1 is not estimated – You could say p\_5 = 1, but that is an irrelevant statistic.

2)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Survival | 0.757 | 0.782 | 0.877 | 0.467 |  |
| Capture |  | 0.458 | 0.440 | 0.422 | 0.405 \*\* |

3) The logit-linear regression model for capture probability. AIC for the time-specific model is 1.92 units larger (578.94 for logit-linear, 580.86 for time-specific)

4) The logit-linear model (se for Phi, time 2 = 0.090 for logit-linear, 0.127 for time-specific)

5) Estimated Phi = 0.81, se = 0.11

6)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Lambda | 1.04 | 0.76 | 0.81 | 0.50 |  |

7) The model without sex is better supported, but it is plausible. More specific conclusions will depend on your philosophy. The numeric details are:

|  |  |  |  |
| --- | --- | --- | --- |
|  | AIC | Delta AIC | Model weight |
| Without sex | 578.938 | -- | 0.62 |
| Phi depends on sex | 579.910 | 0.972 | 0.38 |

8) Again, the model without sex is better supported, but it is not especially plausible. More specific conclusions will depend on your philosophy. The numeric details are:

|  |  |  |  |
| --- | --- | --- | --- |
|  | AIC | Delta AIC | Model weight |
| Without sex | 578.939 | -- | 0.74 |
| P depends on sex | 5.81.026 | 2.089 | 0.26 |

9) The model with a body weight influence on survival is marginally supported. Delta AIC from the model without any covariates is 1.86.

Optional questions:

O1) Need Intercept for Phi = 1.135. probability = 1 / (1+exp(-1.135) = 0.757

O2) Need Intercept for Phi = 1.135 and time 2 effect for Phi = 0.142. mu for time 2 = 1.135 + 0.142 = 1.277

probability = 1 / (1 + exp(-1.277)) = 0.782

O3) Need Intercept for p = -0.169 and slope for time = -0.0719, mu = -0.169 + -0.0719\*0 = -0.169

probability = 1 / (1 + exp( - -0.169)) = 0.458

Note: Time = 0 for the second study year (first estimable capture probability). Don’t really need the slope coefficient for second year.

O4) Need Intercept for p = -0.169 and slope for time = -0.0719, mu = -0.169 + -0.0719\*3 = -0.385

probability = 1 / (1 + exp( - -0.385)) = 0.405

Note: Time = 3 for Year 5