

Contents

| | |
|--|-----|
| Contents | ii |
| List of Figures | iii |
| Acknowledgments | i |
| 1 Data Manipulation and Management | 1 |
| 1.1 Geographic Coordinate Systems | 1 |
| 1.2 Projected Coordinate Systems | 1 |
| 1.3 Transformations between Coordinate Systems | 1 |
| 1.4 Import and Format Datasets | 6 |
| 1.5 Manipulate polygon data layer | 8 |
| 1.6 Manipulate raster data layer | 10 |
| 1.7 Creating a hexagonal polygon grid over a study area | 17 |
| 1.8 Creating a square polygon grid over a study area | 21 |
| 1.9 Creating buffers | 24 |
| 2 Movement Methods | 28 |
| 2.1 Importing datasets from a web source | 28 |
| 2.2 Movement Trajectories | 29 |
| 2.3 Distance between locations | 32 |
| 2.4 Regular trajectories | 35 |
| 3 Home Range Estimation | 40 |
| 3.1 Kernel Density Estimation (KDE) with reference bandwidth selection (h_{ref}) | 40 |
| 3.2 KDE with least-squares cross validation bandwidth selection (h_{lscv}) | 43 |
| 3.3 KDE with plug-in bandwidth selection ($h_{plug-in}$) | 44 |
| 3.4 Brownian Bridge Movement Models (BBMM) | 47 |
| 3.5 Movement-based Kernel Density Estimation (MKDE) | 52 |
| 3.6 Dynamic Brownian Bridge Movement Model (dBBMM) | 58 |
| 3.7 Local Convex Hull (LoCoH) | 62 |
| 3.8 Minimum Convex Polygon (MCP) | 68 |
| 4 Resource Selection | 72 |
| 4.1 Preparing Linear Features | 72 |
| 4.1.1 Formatting layers for package spatstat | 74 |
| 4.1.2 Summarizing linear measures as covariates | 76 |
| 4.2 Preparing Additional Covariates | 77 |
| 4.2.1 Manipulating raster layers for inclusion in modeling procedures | 77 |
| 4.3 Selection Ratios | 84 |
| 4.4 Resource Selection Functions | 86 |

| | | |
|----------|--|-----------|
| 4.4.1 | Logistic Regression | 86 |
| 5 | Miscellaneous Code Tricks | 89 |
| 5.1 | Remove or search for duplicated GPS locations in a data frame | 89 |
| 5.2 | Need to convert back to a matrix to be able to export the data or manipulate the data | 89 |
| 5.3 | Remove quotations marks around values in results table or printout | 89 |
| 5.4 | Bin numeric variables into categories | 89 |
| 5.5 | Recode variables | 90 |
| 5.6 | Jitter UTM coordinates before making SpatialPointsDataFrame | 90 |
| 5.7 | Remove extraneous locations or remove all data for a single animal by animal ID | 90 |
| 5.8 | Generate sequential numbers as ID's for each location then add back to original dataset | 90 |
| 5.9 | Rename data by deleting a portion of the string | 91 |
| 5.10 | A few handy drivers for rgdal input/ouput but run command for complete list . | 91 |