Home Ranges

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Packages

- `adehabitatHR` - early package for home range estimation (KDE, MCP) (Calenge 2007)
- `ctmm` - mostly for AKDE home range estimation (Calabrese, Fleming, and Gurarie 2016)
- `amt` - this package was originally for SSFs but has recent functionality for home ranges (Signer and Fieberg 2021)

Home range approaches

Kernel density estimation (KDE)

Worton, B. J. (1989). **Kernel methods for estimating the utilization distribution in home-range studies**. Ecology, 70(1), 164–168. https://doi.org/10.2307/1938423

Autocorrelated kernel density estimation (AKDE)

Fleming, C. H., Fagan, W. F., Mueller, T., Olson, K. A., Leimgruber, P., & Calabrese, J. M. (2015). **Rigorous home range estimation with movement data: a new autocorrelated kernel density estimator**. Ecology, 96(5), 1182–1188. https://doi.org/10.1890/14-2010.1

Silva, I., Fleming, C. H., Noonan, M. J., Alston, J., Folta, C., Fagan, W. F., & Calabrese, J. M. (2022). **Autocorrelation-informed home range estimation: A review and**

practical guide. Methods in Ecology and Evolution / British Ecological Society, 13(3), 534–544. https://doi.org/10.1111/2041-210x.13786

Brownian bridge approaches (BBMM and dBBMM)

Horne, J. S., Garton, E. O., Krone, S. M., & Lewis, J. S. (2007). **Analyzing animal movements using Brownian bridges**. Ecology, 88(9), 2354–2363. https://doi.org/10.1890/06-0957.1

Kranstauber, B., Kays, R., Lapoint, S. D., Wikelski, M., & Safi, K. (2012). **A dynamic Brownian bridge movement model to estimate utilization distributions for heterogeneous animal movement**. The Journal of Animal Ecology, 81(4), 738–746. https://doi.org/10.1111/j.1365-2656.2012.01955.x

Conceptual considerations

Range vs occurrence distributions Alston, J. M., Fleming, C. H., Noonan, M. J., Tucker, M. A., Silva, I, Folta, C., Akre, T. S. B., Ali, A. H., Belant, J. L., Beyer, D., Blaum, N., Böhning-Gaese, K., de Paula, R. C., Dekker, J., Drescher-Lehman, J., Farwig, N., Fichtel, C., Fischer, C., Ford, A. T., … Calabrese, J. M. (2022). **Clarifying space use concepts in ecology: range vs. occurrence distributions**. In bioRxiv (p. 2022.09.29.509951). https://doi.org/10.1101/2022.09.29.509951

References

Calabrese, Justin M, Chris H Fleming, and Eliezer Gurarie. 2016. "Ctmm: An r package for analyzing animal relocation data as a continuous-time stochastic process." *Methods in Ecology and Evolution / British Ecological Society* 7 (September): 1124–32. https://doi.org/10.1111/2041-210x.12559.

Calenge, Clément. 2007. "Exploring Habitat Selection by Wildlife with adehabitat." *Journal of Statistical Software* 22 (September): 1–19. https://doi.org/10.18637/jss.v022.i06.

Signer, Johannes, and John R Fieberg. 2021. "A fresh look at an old concept: home-range estimation in a tidy world." *PeerJ* 9 (March): e11031. https://doi.org/10.7717/peerj.11031.