Step selection functions (SSF)

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Table of contents

Packages

- `amt` - main package for SSFs (Johannes Signer, Fieberg, and Avgar 2019)

Tutorials and resources

####`amt` **preparing data** - https://cran.r-project.org/web/packages/amt/vignettes/p1_getting_started.html

`amt` fitting step selection functions

- https://cran.r-project.org/web/packages/amt/vignettes/p4_SSF.html

Useful papers

(Fortin et al. 2005) - the OG SSF paper Fortin, D., Beyer, H. L., Boyce, M. S., Smith, D. W., Duchesne, T., & Mao, J. S. (2005). **Wolves influence elk movements: Behavior shapes a trophic cascade in Yellowstone National Park**. Ecology, 86(5), 1320–1330. https://doi.org/10.1890/04-0953

(Avgar et al. 2016) - for integrating movement and resource selection (with movement interactions) Avgar, T., Potts, J. R., Lewis, M. A., & Boyce, M. (2016). **Integrated step selection analysis: bridging the gap between resource selection and animal**

movement. Methods in Ecology and Evolution, 7(5), 619–630. https://doi.org/10.1111/2041-210x.12528

(Fieberg et al. 2021) - helpful guide for interpreting parameters in RSFs and SSFs Fieberg, J., Signer, J., Smith, B., & Avgar, T. (2021). **A "How to" guide for interpreting parameters in habitat-selection analyses**. The Journal of Animal Ecology, 90(5), 1027–1043. https://doi.org/10.1111/1365-2656.13441

(J. Signer et al. 2023) - for generating simulations from SSFs Signer, J., Fieberg, J., Reineking, B., Schlägel, U., Smith, B., Balkenhol, N., & Avgar, T. (2023). **Simulating animal space use from fitted integrated Step-Selection Functions (iSSF)**. Methods in Ecology and Evolution. https://doi.org/10.1111/2041-210x.14263

(Hofmann et al. 2023) - full workflow from fitting SSFs, running simulations, and calculating connectivity Hofmann, D. D., Cozzi, G., McNutt, J. W., Ozgul, A., & Behr, D. M. (2023). **A three-step approach for assessing landscape connectivity via simulated dispersal: African wild dog case study**. Landscape Ecology, 38(4), 981–998. https://doi.org/10.1007/s10980-023-01602-4

(Michelot et al. 2024) - a helpful conceptual overview of what SSFs are and how they're estimated Michelot, T., Klappstein, N. J., Potts, J. R., & Fieberg, J. (2024). **Understanding step selection analysis through numerical integration**. Methods in Ecology and Evolution, 15(1), 24–35. https://doi.org/10.1111/2041-210x.14248

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Avgar, Tal, Jonathan R Potts, Mark A Lewis, and Mark Boyce. 2016. "Integrated step selection analysis: bridging the gap between resource selection and animal movement." *Methods in Ecology and Evolution* 7 (May): 619–30. https://doi.org/10.1111/2041-210x.12528.

Fieberg, John, Johannes Signer, Brian Smith, and Tal Avgar. 2021. "A 'How to' guide for interpreting parameters in habitat-selection analyses." *The Journal of Animal Ecology* 90 (May): 1027–43. https://doi.org/10.1111/1365-2656.13441.

Fortin, Daniel, Hawthorne L Beyer, Mark S Boyce, Douglas W Smith, Thierry Duchesne, and Julie S Mao. 2005. "Wolves influence elk movements: Behavior shapes a trophic cascade in Yellowstone National Park." *Ecology* 86 (May): 1320–30. https://doi.org/10.1890/04-0953.

Hofmann, David D, Gabriele Cozzi, John W McNutt, Arpat Ozgul, and Dominik M Behr. 2023. "A three-step approach for assessing landscape connectivity via simulated dispersal: African wild dog case study." *Landscape Ecology* 38 (February): 981–98. https://doi.org/10.1007/s10980-023-01602-4.

Michelot, Théo, Natasha J Klappstein, Jonathan R Potts, and John Fieberg. 2024. "Understanding step selection analysis through numerical integration." *Methods in Ecology and Evolution* 15 (January): 24–35. https://doi.org/10.1111/2041-210x.14248.

Signer, J, J Fieberg, B Reineking, U Schlägel, B Smith, N Balkenhol, and T Avgar. 2023. "Simulating animal space use from fitted integrated Step-Selection Functions (iSSF)." *Methods in Ecology and Evolution*, December. https://doi.org/10.1111/2041-210x.14263.

Signer, Johannes, John Fieberg, and Tal Avgar. 2019. "Animal movement tools (amt): R package for managing tracking data and conducting habitat selection analyses." *Ecology and Evolution* 9 (January): 880–90. https://doi.org/10.1002/ece3.4823.