A review of competitive measures:

Example: , , , and ,

## Accessibility. Dsd plain

* Only 1 step
  + Thus,
  + = 164.643
  + = 222.245 (the opportunities are here for 1 and for 2. This is not consistent. SA is consistent in how it allocates the resource (which is opportunities directly not the level of service/PPR))

Shen’s 1998 Model (same as 2SFC)

* One step
* Calculated:

  + =

The population seeking opportunity enters the denominator multiple times. It is a greedy (population) accessibility measure – since the person enters every opportunity it can possibly enter but it is inconsistent because some people can enter a lot more opportunities than other people but you don’t know which ones do that. This is accessibility, the potential to interact with opportunities.

* Greedy population

SA is not accessibility – it’s availability.

* Greedy population is not allowed as the base assumption. This is realistic in how people actually use an opportunity (1 person per opp).

Next this is shen’s but put in a dif way.

2-step floating catchment (2SFC). W. Luo, F.H. Wang. Measures of spatial accessibility to health care in a GIS environment: synthesis and a case study in the Chicago region. Environ. Plann. Des., 30 (6) (2003), pp. 865-884

* The first step is calculating the physician- or provider-to-population ratio (PPR), , for each clinic at location j. Travel time, , is binary impedance function. is the population of zone i
* The second step calculates accessibility Ai for the population centres as the sum of the physician-to-population ratios Rj weighted by the impedance function:

Calculated:

* + Thus,
  + = 0.746
  + = 1.007

Jeff Allen’s Competitive measure.. the solved example is in Spatial-Availability-Refreshed.Rmd

* Equation 1:
  + = accessibility of j/(weighted population/accessibility of i)
* Equation 2:
  + =
* Converge the two such that Ai = Li; Convergence is guaranteed if ∑*Oj* = ∑*Pi*

Try 1:

Assume Lj,n = 1

* + = 1 , converged!
* The iterative procedure – doesn’t take long but it does require the process
* Also needs ∑*Oj* = ∑*Pi*  , which is a big assumption
* Accessibly is still the basis of this – it constraints accessibility from both sides (greedy population)
* The interpretation is not straight forward
* L is constrained by A, A is constrained by L.
* Our SA – is more conceptually clear.
* Check to see if it is ‘consistent’ … or if it is competition

Now introducing consistency. The floating catchments introduce competition but are still inconsistent.

Balanced 2-step floating catchment approach (B2SFCA). Maria Demitiry, Christopher D. Higgins, Antonio Páez, Eric J. Miller, Accessibility to primary care physicians: Comparing floating catchments with a utility-based approach, Journal of Transport Geography, Volume 101, 2022, 103356, ISSN 0966-6923, https://doi.org/10.1016/j.jtrangeo.2022.103356.

* Step one
  + (in the SA measure, Rj is just Oj. It’s simpler and doesn’t use this PPR allocation. The FCA allocates the PPR i.e. the level of service).
* Step two
* Calculated:
  + Thus,
  + = 0.6258197
  + = 0.8447683