MATH 251: Topology II

[syllabus]

- [exam dates]
- [participation]
- [plagiarism]
- [Jan 30 add/drop deadline]
- [course objectives]

R real line

what topologies can we put on R?

- analytic
- discrete
- indiscrete
- finite complement (aka cofinite)
  [generated by R – S for finite S]
- lower limit (aka Sorgenfrey)
  [generated by [a, b) for a < b]

Q which are most similar to analytic?

e.g., connected
Hausdorff
locally compact

Df a top space X is connected iff

there is no pair of disjoint nonempty open U, V sub X s.t. X = U cup V [draw]

e.g., analytic
indiscrete
cofinite

Df X is Hausdorff ["séparé"] iff

for any x ≠ y in X, have disjoint open U, V sub X s.t. x in U and y in V [draw]

e.g., analytic
discrete
lower limit

Df X is locally compact iff

for any x in X, have open U and compact K sub X s.t. x in U sub K [draw]

[which is stronger, compact or locally compact?]

locally compact but not compact:

analytic [x in (x – 1, x + 1) sub [x – 1, x + 1]]
discrete [{x} is both open and compact]

compact:

indiscrete
cofinite [if {U_i}_i is an open cover of R, then some U_i is nonempty]

<u>Thm</u> the lower limit top is not locally compact

[will do proof later]

focus of this course:

locally compact Hausdorff spaces
[usually but not always connected]

next two weeks:

more on Hausdorffness,
connectedness,
compactness