suppose p : E to X is cts

<u>Df</u> p is a <u>covering map</u> iff, for all x in X, we have an open nbd x in U sub X s.t.

1) p^{-1}(U) is homeo to a union of disjoint copies of U
2) p restricts to a homeo from each copy onto U

here, we say U is <u>evenly covered</u> by p

<u>Ex</u> let p : (–1, 1) to [0, 1) be squaring

if 0 < a < b, then (a, b) is evenly covered
but [0, b) is never evenly covered

<u>Ex</u> let p : (–1, 1) to S^1 be

p(x) = (cos(2πx), sin(2πx))

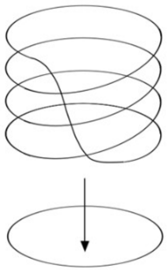
open nbd's of 0 are not evenly covered

but! p : R to S^1 defined by the same formula is a covering map

<u>Ex</u> identity maps Id : X → X are <u>always</u> covering maps

<u>Ex</u> more generally:

for any n > 0, a covering p_n : S^1 to S^1 s.t. the fiber p_n^{-1}(x) has cardinality n for all x



https://ahilado.wordpress.com/2017/04/14/covering-spaces/

we say that the covering is <u>of degree n</u>, or <u>n-fold</u>

<u>Ex</u> p_m × p_n : S^1 × S^1 to S^1 × S^1
is a covering:

of what degree? [mn]

more generally:

if p : E to X and p′ : E′ to X′ are covering maps,
then so is p × p′

<u>Ex</u> coverings of the figure-eight X: