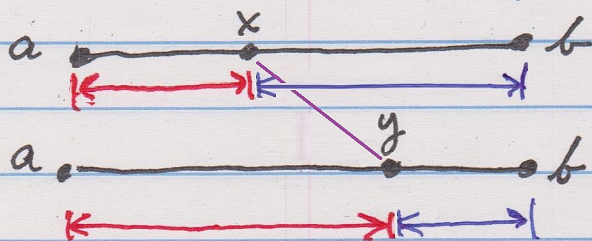


Here is another simple example to illustrate how homeomorphisms can bend and stretch a space.

Let  $X = [a, b]$  with  $a < x < y < b$ . Then there is a homeomorphism  $f: X \rightarrow X$  such that  $f(a) = a$ ,  $f(x) = y$ ,  $f(b) = b$ .



$f$  stretches  $[a, x]$  to  $[a, y]$  linearly, and  $f$  shrinks  $[x, b]$  to  $[y, b]$  linearly.

Note that the restriction of  $f$  to  $(a, b)$  yields a homeomorphism  $h$  from  $(a, b)$  to itself such that  $h(x) = y$ . So given two points of  $(a, b)$

there is a homeomorphism  $h$  from  $(a, b)$  to itself which sends one point to the other.

See the first page of [intro 2 top A-12c.pdf](#) for detailed proofs of the assertions in the discussion above.