

Ma502: Metamathematics I one more problem for 0th homework set, now due wednesday, september 5th. Bring your solutions to class, or slide them under the door of SEO716.

4. Suppose you have two dense linear orderings without endpoints; that is, two S -structures M and N , for a symbol set $\{<\}$ containing one binary relation symbol, such that in each structure

1. for any two elements of the universe x and y , exactly one of $x < y$, $y < x$, and $x = y$ is true;
2. for any three elements of the universe x , y , and z , if $x < y$ and $y < z$ are true, then $x < z$ is also true;
3. (dense) between any two points of the universe, there is another point;
4. (no endpoints) for every element x of the universe, there are elements y and z such that $x < y$ and $z < x$ hold.

If M and N are countable, show that $M \cong N$ by producing a winning strategy for the maker in the back-and-forth game.