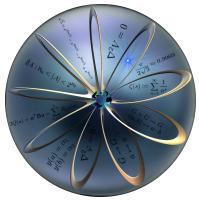

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Dilworth's theorem

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Theorem. *If P is a poset with width $w < \infty$, then w is also the smallest integer such that P can be written as the union of w chains.*

Remark. The smallest cardinal c such that P can be written as the union of c chains is called the *chain covering number* of P. So Dilworth's theorem says that if the width of P is finite, then it is equal to the chain covering number of P. If w is infinite, then statement is not true. The proof of Dilworth's theorem and its counterexample in the infinite case can be found in the reference below.

References

[1] J.B. Nation, "Lattice Theory", `http://www.math.hawaii.edu/ jb/lat1-6.pdf`http://www.m
6.pdf