

Transfinite Computers and Infinite Running-time

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It is well-known that the Ford-Fulkerson algorithm for finding a maximum flow in a network need not terminate if we allow the arc capacities to take irrational values. Every non-terminating example converges to a limit flow, but this limit flow need not be a maximum flow. Hence, one may pass to the limit flow and begin the algorithm again. In this way, we may view the Ford-Fulkerson algorithm as a transfinite algorithm and measure its running time via ordinal numbers. Somewhat surprisingly, we are able to determine the ordinal running time of the Ford-Fulkerson algorithm almost exactly.

No knowledge of ordinals or network flows will be assumed.

This is joint work with Spencer Backman.