A decision procedure for IS4

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In these two talks we demonstrate decidability for the intuitionistic modal logic S4 first formulated by Fischer Servi. This solves a problem that has been open for almost thirty years since it had been posed in Simpson's PhD thesis in 1994. We obtain this result by performing proof search in a labelled deductive system that, instead of using only one binary relation on the labels, employs two: one corresponding to the accessibility relation of modal logic and the other corresponding to the order relation of intuitionistic Kripke frames. Our search algorithm outputs either a proof or a finite counter-model, thus, additionally establishing the finite model property for intuitionistic S4, which has been another long-standing open problem in the area. In Part 1 we will introduce intuitionistic modal logics, we will present our labelled proof system, and we show how it can be employed for decision procedures in general. In Part 2 we will go into the specifics of the IS4 decision algorithm.