



## **Determining soil hydraulic properties from infiltration experiments monitored with time domain reflectometry**

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Experimental methods are needed to determine the spatial variability of soil hydraulic properties within a field plot in acceptable time. Vertically installed Time Domain Reflectometry (TDR) probes have been used during constant flux and constant head infiltration experiments to determine hydraulic properties. Because these studies only determined cumulative water storage or depth to the wetting front from the TDR measurements, it was not possible to determine all relevant soil hydraulic parameters. Recently, TDR wave propagation models have become available that allow to determine the variation of the water content along the wires of the TDR probe. In general, the determination of this water content profile from a TDR measurement is an ill-posed problem. Therefore, we formulate a coupled inverse problem where a hydrological model is used to constrain the range of possible solutions from the TDR inverse problem. In this paper, we use numerical experiments to explore whether this couple inverse approach can be used to determine the water retention and hydraulic conductivity parameters of the Mualem-van Genuchten model during constant-infiltration or constant-head infiltration experiments. Attention will also be paid to the impact of the initial conditions on the well-posedness of the inverse problem.