This paper proposes a new method to solve certain classes of systems of multivariate equations over the binary field and its cryptanalytical applications. We show how heuristic optimization methods such as hill climbing algorithms can be relevant to solving systems of multivariate equations. A characteristic of equation systems that may be efficiently solvable by the means of such algorithms is provided. As an example, we investigate equation systems induced by the problem of recovering the internal state of the stream cipher Trivium. We propose an improved variant of the simulated annealing method that seems to be well-suited for this type of system and provide some experimental results.