A deviation constraint mechanism (dc-mechanism) is a triple \((M, D_i, g)\). As usual, the joint strategy space \(M = \Pi_{i \in N} M_i\) where \(M_i\) stands for the strategy set of agent \(i\). The outcome function \(g\) maps every joint strategy to an alternative, i.e. \(g : M \rightarrow A\). For each agent \(i\), a constraint function, \(D_i\), maps each joint strategy of the others \(m_{-i}\) to a subset of \(M_i\), i.e. \(D_i : M_{-i} \rightarrow M_i\). In a dc-mechanism, if an agent \(i\) would best respond to strategy \(m_{-i}\), he is constraint to choose his strategy from \(D_i(m_{-i})\).

Given a preference profile \(R\), a joint strategy \(m\) is an equilibrium of the dc-mechanism, \((M, D_i, g)\), at \(R\) if and only if for each \(i \in N\) and \(m'_i \in D_i(m)\), \(g(m) R_i g(m'_i, m_{-i})\). We denote the equilibria of \((M, D_i, g)\) at \(R\), by \(E(M, D_i, g, R)\).

Given \(N \geq 3\), prove or disprove that \(F\) is Nash-implementable if and only if there exists a dc-mechanism, \((M, D_i, g)\), such that for each preference profile \(R\), \(F(R) = E(M, D_i, g, R)\).