**Aspanning-Three Based Approach For Generating Fault-free Rule Bases**

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**Abstract:**

**This article presents a new approach for generating fault-free rule bases, which have no redundancy circularity, inconsistency, contradiction/conflict and un-reachability. The approach makes use of spanning trees. A new algorithm, based on this approach, is presented which checks a rule base for different kinds of faults. The rule base is represented using a directed graph. The algorithm devises a spanning tree/forest of the underlying directed graph by treating the directed graph as an undirected graph, and checks for various faults and properties. The algorithm devises a new rule base (which is a subset of the original rule base) that is equivalent, in terms of its reasoning capabilities, to the original rule base, with the properties that the new rule base is free from redundancy. It also determines the set of rules that cause redundancy and circularity faults. Once the new rule base is determined, checking for the remaining faults, namely inconsistency, contradiction, and un-reachability, can be performed easily using the generated structures.**

**الملخص**

**يعرض هذا البحث طريقة/ خوارزمية جديدة للحصول على مجموعات قواعد خالية من الأخطاء مثل التكرار، الدائرية، عدم التوافق، التناقض، وعدم الوصول وذلك باستخدام (spanning tree) . تمثل مجموعة القواعد بمخطط متجه، وتقوم الخوارزمية بإيجاد (spanning tree/forest) لهذا المخطط وذلك بالتعامل مع المخطط المتجه وكأنه غير متجه ومن ثم اكتشاف الأخطاء والخصائص المختلفة . كما تقوم الخوارزمية بإيجاد مجموعة جزئية من القواعد المكافئة للمجموعة الأصلية من حيث القدرة و الأستنتاجية إلا أنها خالية من الأخطاء .**