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Orderly Algorithm to Enumerate Central Groupoids and Their Graphs

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摘要
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Orderly Algorithm to Enumerate Central Groupoids and Their Graphs

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Abstract A graph has the unique path property UPP_n if there is a unique path of length n between any ordered pair of nodes. This paper reiterates Royle and MacKay's technique for constructing orderly algorithms. We wish to use this technique to enumerate all UPP_2 graphs of small orders 3^2 and 4^2 . We attempt to use the direct graph formalism and find that the algorithm is inefficient. We introduce a generalised problem and derive algebraic and combinatoric structures with appropriate structure. Then we are able to design an orderly algorithm to determine all UPP_2 graphs of order 3^2 , which runs fast enough. We hope to be able to determine the UPP_2 graphs of order 4^2 in the near future.

Key words [orderly algorithms](#) [paths in directed graphs](#) [enumeration](#)

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