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## A Digital Ecosystem-based Framework for Math Search Systems

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**Abstract:** Text-based search engines fall short in retrieving structured information. When searching for  $x(y+z)$  using those search engines, for example Google, it retrieves documents that contain  $xyz$ ,  $x+y=z$ ,  $(x+y+z)=xyz$  or any other document that contain  $x$ ,  $y$ , and/or  $z$  but not  $x(y+z)$  as a standalone math expression. The reason behind this shortage; is that the text-based search engines ignore the structure of the mathematical expressions. Several issues are associated with designing and implementing math-based search systems. Those systems must be able to differentiate between a user query that contains a mathematical expression, and any other query that contains only a text term. A reliable indexing approach, along with a flexible and efficient representation technique are highly required. Eventually, text-based search systems must be able to process mathematical expressions that are well-structured and have properties that make them different from other forms of text. Here, in this context we take advantage from the concept of digital ecosystems to refine the text search process so it becomes applicable in searching for a mathematical expression. In this research, a framework that contains the basic building blocks of a math-based search system is designed.