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An invitation to alternating links and the Greene-Howie Theorem

Alternating links are a particularly well-behaved family of links. From a (reduced) alternating diagram of a link L , one can read off the crossing number of L , its prime factors, and its split components. Moreover, alternating links are highly sensitive to the invariants of knot theory. In short, an alternating link wears its heart on its sleeve. There is, however, one major source of dissatisfaction in the theory of alternating links: their definition is diagrammatic, dependent on a particular picture of the link. This concern was famously voiced by Ralph Fox, who asked "What is an alternating link?" Fox sought a topological interpretation of the alternating condition, one devoid of the notion of diagram. The matter was finally put to rest in a pair of seminal 2017 papers by Joshua Greene and Joshua Howie. In this talk, we discuss the history and basic properties of alternating links, the Greene-Howie Characterisation Theorem for alternating links, and its implications and extensions. Ongoing work in this area is discussed.