

Carbon nanotubes and their resonance graphs

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Carbon nanotubes are chemical compounds made of carbon which possess a cylindrical structure. Open-ended single-walled carbon nanotubes are called tubulenes. The resonance graph of a tubulene reflects the interference among its Kekulé structures. First we will present some basic properties of tubulenes and their resonance graphs. Then we will describe the structure and the length of a shortest path in the hexagonal lattice. This result is then used to give a condition under which the resonance graph of a tubulene is not connected. Furthermore, we will mention that every connected component of the resonance graph of a tubulene is either a path or a graph of girth 4. We will also provide a condition for a tubulene under which every connected component of its resonance graph different from a path without vertices of degree one is 2-connected.