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Mariel Vazquez* (mariel@sfsu.edu), San Francisco State University, Mathematics Department, 1600 Holloway Ave, San Francisco, CA 94132. *Graphs and DNA rearrangements*. Preliminary report.

DNA rearrangements result from double-stranded DNA breakage and rejoining in a cell. These rearrangements can be characterized, and their mechanisms of formation analyzed, using discrete models. We have developed a mathematical framework for characterizing chromosome aberrations, including complex ones involving 3, 4 or more breaks in single reactions. A DNA rearrangement multigraph specifies the number of breakpoints, the rearrangement rules and the way in which one or more DNA segments are involved. We have extensively analyzed radiation data where normal cells are irradiated and the resulting DNA changes are observed at the first mitosis after irradiation. I will discuss how radiation-induced chromosome rearrangements can be described, classified and analyzed using rearrangement multigraphs. I will also mention a few novel applications to cancer cytogenetics and comparative genomics. (Received August 19, 2005)