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Quantitative measures for mitotic spindle pattern formation structures STUART SCHAFFNER, Northeastern U., JORGE JOSE, SUNY at Buttalo, Northeastern U. — Recently introduced biophysical models successfully reproduce the basic spindle patterns found in *in-vitro* meiotic experiments. Numerical simulations of the model show the detailed behavior of microtubules and positive and negative walking molecular motors as they interact to form spindle patterns. Previous results were mostly qualitative in nature, but we are now developing quantitative measures to characterize the formation of spindle structures. In particular, minus-directed crosslinking motors bind microtubules together in pairs. This pairwise binding can be represented by a graph where the vertices are microtubules and the edges are crosslinking motors. Highly interconnected components of this graph correspond to bundles of motion-correlated microtubules. Numerical simulations show that these bundles are a prominent feature of spindle pole assembly. Using general ideas of random graph theory, we can measure deviations from random connectivity. We also calculate an approximation of the strain energy induced by contact forces between the microtubules and make estimates that could be tested experimentally.

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