Flat-state connectivity [Aloupis et al. 2002 & 2002]

- NP-hardness of flattenability
  ⇒ many fixed-angle chains have no flat state
- however, proteins do have flat states

Flat-state connected = there is a dihedral motion avoiding intersection between every pair of non-self-intersecting flat configurations of the linkage

Flat-state disconnected otherwise

Summary of results:

Linkage	Flat-state connectivity
open chain	OPEN
... with a monotone state	OPEN
... with nonacute angles	Connected
... with equal acute angles	Connected
... with angles in $(60°, 90°)$ & unit edge lengths	Connected
... using 180° edge spins	Disconnected
... with orthogonal angles & using 180° edge spins	Connected
set of open chains, pinned at one end, orthogonal	Connected
... some edges held rigid	Disconnected
closed chain	OPEN
... nonacute	OPEN
... orthogonal	OPEN
... orthogonal & unit edges	Connected
tree	OPEN
... orthogonal	OPEN
... orthogonal & some edges held rigid	Disconnected
graph (planar)	Disconnected