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Dynamics of the 1,n compound pendulum[1] JOHN STARRETT, JOHN KORBIN, New Mexico Institute of Mining and Technology — We analyze the motion of the $1, n$ compound pendulum, that is, a pendulum system with one upper and n lower pendula. In contrast to the more well known $1, 1$ pendulum (the double pendulum), the $1, n$ pendulum exhibits an exchange of energy between the lower pendula, which can lead to bursts of over-the-top motion for one or more of the lower pendula as their energy is suddenly pumped up from a lower energy state. The $1, n$ systems can exhibit chaotic dynamics, but as $n \to \infty$, the motion of the upper pendulum approaches zero and the lower pendula become independent of each other, and the system ceases to be chaotic.

[1]A movie of the 1,2 compound pendulum may be seen on the YouTube.com video site at http://www.youtube.com/watch?v=2JzMJNMYbRw

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