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Response to natural disturbance and attack in a trade model¹ BEI-BEI SU, Yangzhou University, TIAN XU, Shanghai Jiaotong University, DA-REN HE, Yangzhou University — We suggest a trade model, which may describe the trade activities between the open ports along Yangzi River. The cumulative distribution of the quantities of port export and import, generalized by the model, shows a good agreement with our statistical results over 229 open ports. Randomly select a port and let its production decrease greatly by a fixed ratio (a disturbance), we find that the averaged quantities of port export and import increase obviously. This means that, in a healthy trade network, a lot of elements can make benefits when one of them is hit by a natural calamity. When select the port that has most trade relationship with others and let its production decrease greatly by a fixed ratio (an attack), we find that the averaged quantities of port export and import soon recovers and reach the original value. This healthy response will significantly change if the trade rules in the model are only slightly revised. This result may suggest a feature, which can distinguish healthy complex systems from others.

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