Stability and topology of scale-free networks under attack and defense strategies LAZAROS GALLOS, University of Thessaloniki, Greece, REUVEN COHEN, Bar-Ilan University, Israel, PANOS ARGYRAKIS, University of Thessaloniki, Greece, ARMIN BUNDE, Universitaet Giessen, Germany, SHLOMO HAVLIN, Bar-Ilan University, Israel — We study tolerance and topology of random scale-free networks under attack and defense strategies that depend on the degree k of the nodes. This situation occurs, for example, when the robustness of a node depends on its degree or in an intentional attack with insufficient knowledge on the network. We determine, for all strategies, the critical fraction p_c of nodes that must be removed for disintegrating the network. We find that for an intentional attack, little knowledge of the well-connected sites is sufficient to strongly reduce p_c. At criticality, the topology of the network depends on the removal strategy, implying that different strategies may lead to different kinds of percolation transitions.

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