

Abstract Submitted
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Efficiently achieving consensus in scientific collaboration networks R. DEAN MALMGREN, SAM SEAVER, ROGER GUIMERA, DANIEL DIERMEIER, JULIO OTTINO, LUIS AMARAL, Northwestern University — Recent work by Guimerá et al. [1] indicates that successful collaborative networks are developed from a balance of new and old blood. To first approximation, the efficiency of these collaborative networks to reach consensus on a problem depends on (i) the difficulty of the problem and (ii) the fraction of time each individual spends working on his own versus interacting with his peers. We mimic problem difficulty by the likelihood that an individual obtains the correct answer, and we model social interactions by the majority rule, which is efficient even in the presence of noise [2]. We then study the asynchronous dynamics of small-world [3] and collaborative networks [1] to quantify the efficiency of empirical collaborative networks to achieve consensus. Finally, we examine how altering the balance of new and old blood affects the efficiency of collaborative networks to reach consensus. [1] R. Guimerá, B. Uzzi, J. Spiro, and L. A. N. Amaral. *Science* **308**, 697–702 (2005). [2] A. A. Moreira, A. Mathur, D. Diermeier, and L. A. N. Amaral. *PNAS* **101**(33), 12085–12090 (2004). [3] D. J. Watts and S. H. Strogatz. *Nature* **393**, 440–442 (1998).

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