Positive Linear System

- The spectrum of the matrix **A** (e.g., the Perron-Frobenius eigenvalue and eigenvectors) provides insights on fairness, rate of convergence and transient response: [14]

$$\lim_{k\to\infty} w(k) = \left(\frac{\alpha_1}{1-\beta_1}, \cdots, \frac{\alpha_n}{1-\beta_n} \right)^T,$$

  which, if specialized to the case of $\alpha_i = 1$ and $\beta_i = 0.5$ for all i, is proportional to the all-ones vector as it should be
- Fairness line as Perron-Frobenius right eigenvector
- Classical power method algorithm can simulate AIMD and to visualize the iterates as shown in Figure 2

[14] Abraham Berman, Robert Shorten, and Douglas Leith. Positive matrices associated with synchronised communication networks. Linear Algebra and its Applications, 393:47–54, 2004.