Other applications of Hodge decomp.

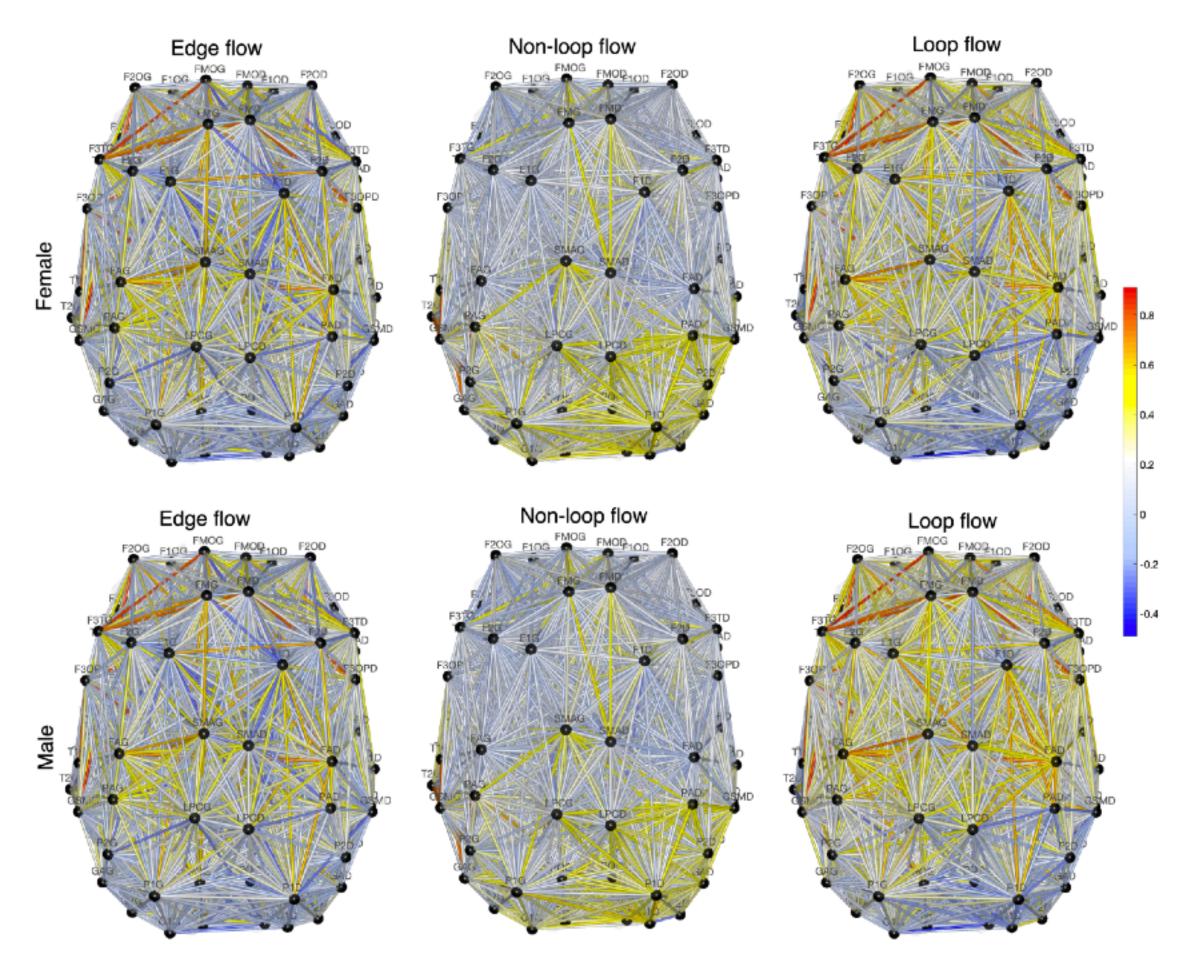


Fig. 14: Top: The average connectivity (edge flow), non-loop flow (middle) and the loop flow (right) of the female (top) and male networks (bottom).

- Brain networks (Anand et al. 2022)

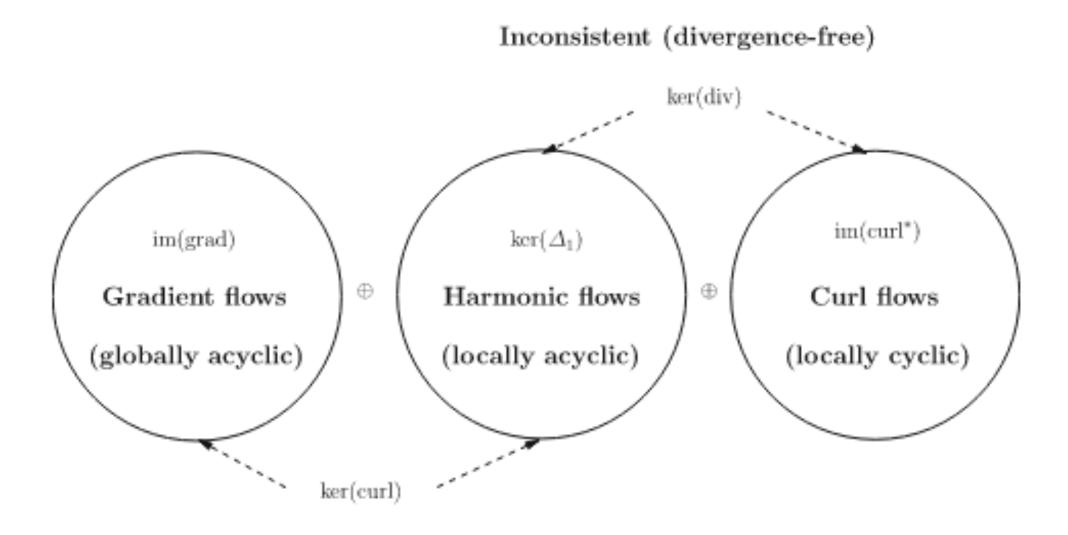
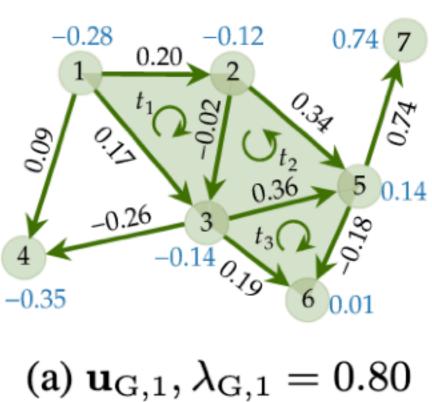


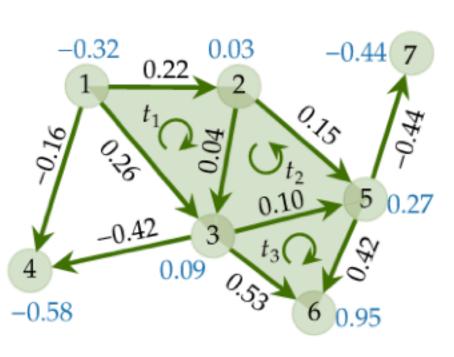
Fig. 2 Hodge/Helmholtz decomposition of pairwise rankings

- Ranking problems (Jiang et al. 2011)
- Condorcet paradox: cyclic

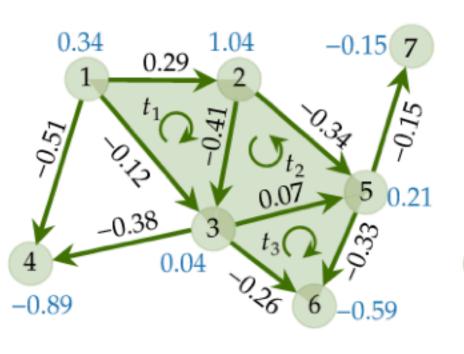
Locally consistent (curl-free)

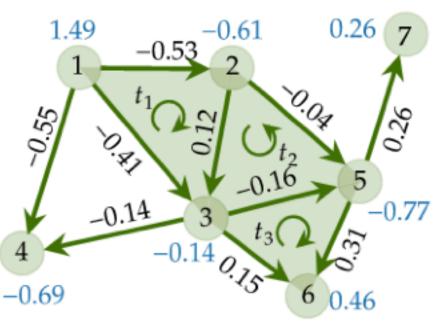
Full Eigenbasis of example SC

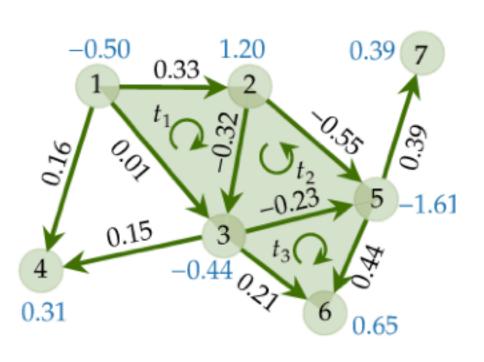


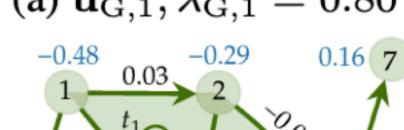


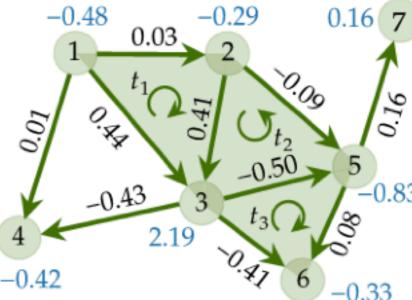
(b) $\mathbf{u}_{\rm G,2}, \lambda_{\rm G,2} = 1.61$

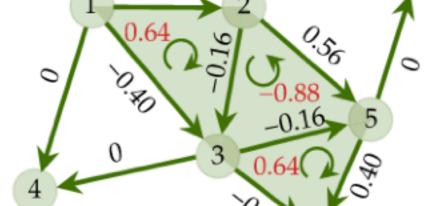


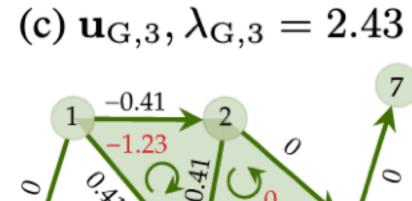


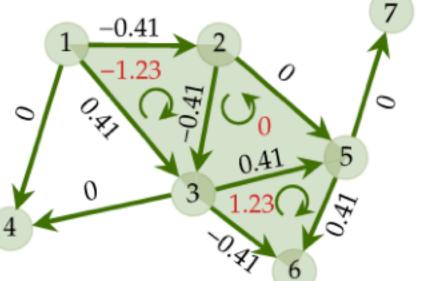


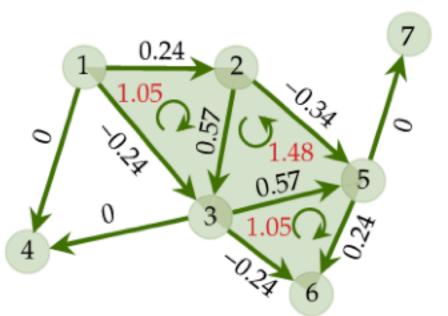




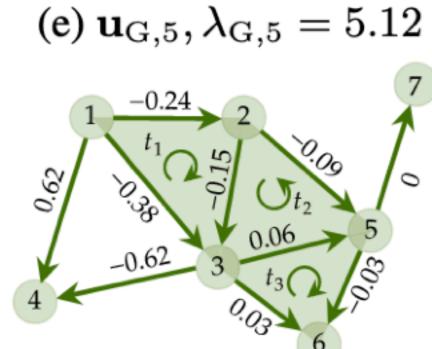








(d) $\mathbf{u}_{G,4}, \lambda_{G,4} = 3.96$



(f)
$$\mathbf{u}_{G,6}, \lambda_{G,6} = 6.08$$

(g)
$$\mathbf{u}_{\mathrm{C},1}, \lambda_{\mathrm{C},1} = 1.59$$

(h)
$$\mathbf{u}_{\mathrm{C},2}, \lambda_{\mathrm{C},2} = 3.00$$

(i)
$$\mathbf{u}_{\mathrm{C},3}, \lambda_{\mathrm{C},3} = 4.41$$

(j)
$$\mathbf{u}_{\mathrm{H}}, \lambda_{\mathrm{H}} = 0$$