

# COUPLING MATRIX

## DEFINITION

- $\mathbf{C} = (\text{DPA})_{3 \times 3} = \sum_i \mathbf{s}_i^T \mathbf{P}_{ij} \mathbf{e}_j$

## PROPERTIES

- $\mathbf{C}$  is irreducible and stochastic
- For  $\mathbf{W}^T = [\alpha_1 \mathbf{s}_1^T \quad \alpha_2 \mathbf{s}_2^T \quad \alpha_3 \mathbf{s}_3^T]$  and  
$$\mathbf{W}^T = [\alpha_1 \quad \alpha_2 \quad \alpha_3]$$
it must be the case that  $\mathbf{W}^T \mathbf{C} = \mathbf{W}^T$

## CONCLUSION

- If we can estimate the  $\mathbf{s}_i^T$ 's, then we can estimate the  $\alpha_i$ 's by computing the steady state vector of  $\mathbf{C}$ .