Statistical Approach

Most calculations can be summarized by

- Choose a norm: $\|\mathbf{A}\|_{\mathsf{E}} = \left(\mathsf{E}\,\mathrm{tr}(\mathbf{A}^{\mathsf{T}}\mathbf{A})\right)^{1/2}$ or ...
- Use the eigenvalue/eigenvector decomposition of $\widehat{\mathbf{P}}^f$:

$$\widehat{\mathbf{P}}^f = \mathbf{\Gamma}\hat{\mathbf{\Lambda}}\mathbf{\Gamma}^{\mathsf{T}}$$

  $\mathbf{\Gamma}$ contains the eigenvectors
  $\widehat{\mathbf{\Lambda}} = (\hat{\lambda}_{ij})$

- Simplify the norm to an expression containing $\{\lambda_i\}$, n:

$$\|\widehat{\mathbf{P}}^f\|^2_{\mathsf{E}} = \mathsf{E}\,\mathrm{tr}(\widehat{\mathbf{P}}^{f\mathsf{T}}\widehat{\mathbf{P}}^f) = \mathsf{E}\,\mathrm{tr}(\mathbf{\Gamma}^{\mathsf{T}}\widehat{\mathbf{P}}^f\mathbf{\Gamma}\mathbf{\Gamma}^{\mathsf{T}}\widehat{\mathbf{P}}^f\mathbf{\Gamma}) = \mathsf{E}\,\mathrm{tr}(\widehat{\mathbf{\Lambda}}\widehat{\mathbf{\Lambda}}) = \ldots$$