NCAA Power Index (NPI)

Introduction:

The NCAA Power Index (NPI) is a new procedure for selecting teams to NCAA Division III championship tournaments. The old method was extensive and based on the RPI. The new method is much simpler. While based on the same two components—a team's performance (WL record) and its strength of schedule—the NPI's SOS is simpler, relying solely on an average of the opponents' NPIs.

Division III NCAA Sports
employing NPI
Field Hockey
Football
Men's Soccer
Women's Soccer
Women's Volley Ball
Men's Basketball
Women's Basketball
Men's Ice Hockey
Women's Ice Hockey
Baseball
Men's Lacrosse
Women's Lacrosse
Softball
Men's Volley Ball

Iteration in the NPI Calculation?

The NPI is calculated as follows:

$$NPI_{(i+1)} = dial * \left(\frac{W}{W+L}\right) + \left(1 - dial\right) \sum_{i=1}^{n} \frac{NPI_i}{n}$$

NPI = NCAA Power Index i = team number dial = weight factor (can be modified for different sports. Ranges from 0.0 to 1.0)

W = wins L = losses n = number of teams in the division.

 Σ = summation symbol

Simple but Coupled: A Major Shift from RPI

While both RPI and NPI use WL records and SOS:

- **RPI** treated them as **independent** components
- **NPI couples** them SOS depends on opponent NPIs, which in turn depend on **their** records and opponents. This nested design arguably reflects reality better.
- Additional Factors: Bonus points for defeating a higher ranked team or top 20 team; treating overtime games differently; no reduction for defeating a weak team, home field advantage (0.8/1.2 for home/away), etc.

Pros Summary

- **Transparency**: Algorithmic, not subjective
- Coupled SOS: More accurate representation of schedule difficulty
- **Sport-specific tuning**: Via the dial parameter
- Forecasting: Helps teams know where they stand

X Cons Summary

- **Dial tuning is sensitive**: Overemphasizing SOS could lead to teams scheduling tough opponents just for appearance
- Ignores score margins: Especially limiting in high-scoring sports like football or basketball
- "One-size-fits-all" issue: What works for hockey might not for lacrosse
- Edge cases add complexity: Lowering NPI for beating a weak team could feel counterintuitive

• **Overtime complexity**: Not all sports are equally affected by OT rules

Formula is recursive because of the chicken-and-egg issue:

- To compute **Team A's SOS**, you need all **opponents' NPIs**
- But to get those opponents' NPIs, you need their **SOS**, which includes other teams' NPIs...

This circular dependence is resolved by:

- 1. Starting with an initial guess (like setting all NPIs to 0.5),
- 2. **Iterating** through the formula until the values stabilize (i.e., convergence).

This is common in networked systems or ranking algorithms (Google's PageRank works similarly).