Automatic Importance Estimation in Forward Monte Carlo Calculations

Introduction

- Applying splitting and roulette involves knowledge of the importance function

- Splitting can be geometric, space- or energy- dependent.

- Weight windows have an upper and lower bound for a particles weight and can be used for VR.

- parameters specified by user rises significantly with each degree of freedom.

- Space and energy (WW) splitting yields two to five times better calculational efficiency than geometry splitting.

Importance Generator Theory

- Importance = expected score particle will generate in tally.

- Importance = total score due to particles leaving cell/ weight leaving the cell

- Generator requires adequate sample size leaving the cell.

- Zero variance solution = every history contributes the same score

- WW inversely proportional to variance.

  - WW is chosen so that track weight*expected score (per unit track rate) = constant.

Conclusions

- Importance generator is well-optimized after 2 trial runs.

- User can see the importance regions of the problem too.