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Paper Review: Energy Analysis and Optimization for Resilient Scalable Linear Systems

Summary
This paper, like many of the others that we have read previously, addresses the issues that will come with the next generation of supercomputers. Specifically, the researchers set out to find a balance between energy efficiency and resilience in large scale sytems. Since these two factors have traditionally been studied separately from one another, there isn't enough work out there to understand what the relationships will be in exascale systems. This study aims to fill that gap.

Strengths
The comparison between recovery methods in Figure 3 really helped me understand the different benefits and drawbacks of each. I like that they clearly specified the performance metrics they were focusing on early (time-to-solution, power, energy-to-solution). This helped me to stay focused in the reading and understand the study better throughout.

Shortcomings
I got pretty lost in section 3. A lot of the specifics about the models were meaningless to me. In the Conclusion, I was hoping that there would be a longer explanation about where future works building off of this study would be heading. I think it's a really interesting topic and that it will be very useful, and would like to know more details about the next steps.

Improvements
I thought that overall the paper was really good and I actually enjoyed reading it. The only improvement I can think of would be to simplify the explanation of all of the specific models used. I understand that this information would be appreciated a bit more by someone who is more versed in this field, but just wanted to provide feedback from my personal view.

Question(s) for Presenter
- Could you speak more about Forward Recovery? e.g. more details about how it works, how you used it in your study.
- Could you explain the figures and tables found in the Results section with more detail?

Additional Questions
- Can you describe basic idea behind Forward Recovery?
    - It approximates lost data with assignment and reconstruction techniques. It takes more time/energy than CR, but requires fewer iterations to obtain the solution.
- What are the two competing trade-off(s) in the recovery schemes tested?
    - Power vs. Resilience (vs. Time?)
- How can power management help to optimize Forward Recovery for CG?
    - Since there is a one-to-one mapping between processes and data reconstruction, the CPU core being used by that process will run at high frequency while the other cores can

scale down temporarily. This results in significant power savings, as noted in section 4.1.