# Article information:

Performance Analysis of Hybrid ARQ for Ultra-Reliable Low Latency Communications | IEEE Journals & Magazine | IEEE Xplore  
<https://ieeexplore.ieee.org/abstract/document/8603778>

# Article summary:

1. 5G systems need to address the demands of ultra-reliable low latency communication (URLLC) for mission critical MTC (cMTC) applications, which require high reliability, availability and low latency.

2. Hybrid automatic repeat request (HARQ) can improve energy efficiency in wireless communications by providing time diversity, but there is a trade-off between achieving time diversity through retransmissions and having to communicate at a higher rate due to latency constraints.

3. The proposed approach uses HARQ with Chase combining and derives a fixed-point equation to determine the best number of allowed transmission attempts considering the maximum possible energy spent, leading to substantial energy savings compared to direct transmission with frequency diversity in a smart grid teleprotection scenario.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

作为一篇关于超可靠低延迟通信的性能分析的论文，该文章提供了有关使用混合自动重传请求（HARQ）来实现时间多样性和在延迟约束下进行通信所需的能量消耗之间权衡的评估。然而，该文章存在一些潜在偏见和局限性。

首先，该文章主要关注使用HARQ来提高能量效率的策略，并没有探讨其他可能的策略。例如，文章没有考虑使用更高效的编码和调制方案、功率控制或多路径传输等技术来减少能量消耗。此外，文章只考虑了点对点通信场景，并未涉及到更复杂的网络拓扑结构。

其次，该文章没有充分考虑到实际应用中可能出现的风险和挑战。例如，在智能电网保护应用中，由于通信故障或攻击可能导致系统失效，因此需要采取额外的安全措施来确保系统可靠性。此外，在实际应用中还需要考虑设备之间的互操作性、网络拥塞等问题。

最后，该文章并未平等地呈现双方观点。尽管作者提供了一些相关研究结果进行比较，但是他们并未探讨其他可能存在竞争解决方案或不同观点之间的差异。因此，在评估这篇论文时需要注意这些局限性和潜在偏见，并将其与其他相关研究结果进行比较和综合分析。

# Topics for further research:

* Alternative energy-efficient strategies
* Complex network topologies
* Security measures for reliable communication
* Interoperability between devices
* Network congestion management
* Competitive solutions and different perspectives

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