This manuscript presented a high-quality research with a new approach for measurement of the gearbox input torque. Different from the traditional way using strain gauge on the rotating shaft, optical FBG strain sensors were used here on the stationary gearbox housing. Additionally, the alternating part of the signal (due to gear meshing) was used for the torque measurement instead of the absolute value of the signal. As a result, the method can overcome some of the major difficulties in the traditional ways of torque measurement and can be seen as a promising method - at least for certain applications like condition monitoring. However, the method still has to be quantitively validated and certain concerns (from my point of view) still need to be clarified in the **future**:

- The influence of the non-torque load
- Strain distribution along the length of the tooth
- The stability of the calibration under different load cases and over time
- The speed of data processing and possibility of real-time high-frequency measurement
- Time expense in the instrumentation of FBG sensors and cost of interrogator (share use with other measurements?)

The authors have managed to apply the method on a real-size wind turbine gearbox in a professional test campaign and properly analysed the measured data with novel processing methods. Generally, the manuscript made scientific contributions in the measurement and processing methods while proposed a promising method for the industrial application at the same time.

Regarding the content of the manuscript, I would like to give my comments in **the following points**:

1. Section2.3. The position and direction of the FBG sensors.
   After reading the manuscript I would assume that the FBG sensors are installed in the mid-line of the ring gear outer surface and that the sensors are measuring strain in the tangential direction. But since this method was new to me, it took me some time to wonder where exactly and what kind of strains are measured. It would be helpful to add the information explicitly in the text or under one of the figures.

2. Section 2.3 and Section 2.5. Temperature.
   More clarification is needed regarding the temperature influences. As is known that FBG sensors are prone to influences of temperature changes, it is expected from a reader with measurement background that the signal with measured temperature somehow compensated. In the manuscript, it is only mentioned that two temperature sensors are available. After reading through, several questions arise:
   A) are two temperature sensors enough?
   B) at which positions are the two temperature sensors located?
   C) it looks that the temperature measurements are not used in the post processing, the signal was simply detrended instead. why?

   With the given information I could only imagine: the methods focus only on the changes in the strain signals and therefore are not sensitive to the long-term drift caused by temperature change? A temperature non-uniform distribution along the circumference causes probably only a 1P contribution to the Coleman method and very small influence on the 5P, which is used for the torque measurement? Can you please give more words on the topic of temperature influence?

3. Section3.2. Difference in linearity.
   For discussion: could it be that the position of the FBG sensor relative to the nearby tooth/teeth has some contribution to the difference in the slops? The sensor directly under a tooth will likely experience different strain progress as the sensor laying under the middle of

two adjacent teeth. Otherwise, the distribution of strain along the length of the tooth could theoretically also play a part.

4. Page 20 line 333. Correlation of the phase angle with the torque.
   It appears to me that the phase angle describes how the strain are distributed along the circumference upon a certain point of time and is mostly dependent on the azimuth angle of the planet carrier. Is there theoretical basis supporting the correlation?

5. Figure 22 and 23. Comparison with HSS torque possible?
   I'm wondering why the HSS torque was not included in the comparison figures. A direct thought will be to compare the measurement with the calibration reference, which is the mean value of the HSS torque times gearbox ratio. Despite of the dynamics inside the gearboxes, such a comparison can still show the low-frequency behaviours of the measurement. Is there a reason that the HSS torque are not drawn in the figures for comparison?

The followings are comments for the text and language, only as recommendations.

6. Line 61. "3-stage" gearbox.

7. Line 102&136. "on" the surface.

8. Line 114. "input load excitation"

9. Line 115. with the main axis "horizontal"

10. Line 140. the interrogator "sends" a full…

11. Line 141. the word synchronize strongly implies the time sync. A better word should be possible here. For example, "associate"?

12. Line 158. First, a "test" with a …

13. Line 159. The sentence "In both variable …" should be place in front of sentence "First, a test with …"

14. Line 240. "As can be seen in …"

15. Line 414. "On one hand, …"