Amplified-Spontaneous-Emission Feedback Circuit Technique with Improved Optical Power Resolutions

(要約)

改善された光パワー分解能を有する増幅自然放出光帰還回路技術

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This study proposes an ASEFC-based fiber-optic sensing scheme that improves the optical power resolution.

The study's opening chapter is titled "Introduction". This chapter discusses the study's background, research problem, motivation, significance, and scope.

The second chapter of this study is titled "Fundamentals". In this chapter, the fundamental design and features of ASEFC are covered. Additionally, the performance dependence of the ASEFC-based measurement technique is investigated through experimental and numerical simulation. This chapter also covers practical uses of the ASEFC measurement scheme, including loss variation sensing and remote temperature sensing.

The vital section of the thesis dissertation is chapters three, four and five, each containing a significant theme published in peer-reviewed publications. Each chapter includes a background, a description of the experimental configuration, experimental results and discussion, and a conclusion.

Chapter Three is entitled “ASEFC Scheme for Optical Power Sensing.” This chapter discusses the ASEFC-based fiber-optic measurement scheme that significantly improves the optical power resolution.

Chapter Four is “Temperature-controlled ASEFC with improved OPR for Optical Power Sensing.” This chapter discusses a temperature-controlled ASEFC scheme for optical power sensing where two types of pump light sources are used to demonstrate this sensing technique.

Chapter Five is entitled “Bandwidth and Dynamic range characteristics of ASEFC.” This chapter discusses a temperature-controlled ASEFC scheme for remote optical power sensing. The bandwidth and dynamic range of the measurement technique are also discussed in this chapter.

The summary of the thesis and Future Issues are discussed in chapters six and seven.

All References of this thesis dissertation are placed in chapter eight.