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5 BITS DISCRIMINATORS FOR INSTANTANEOUS FREQUENCY MEASUREMENT SUBSYSTEM BASED ON MICROSTRIP STOP BAND FILTER RESONATORS

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ABSTRACT: IFMS (Instantaneous Frequency Measurements Subsystem) is a system that supervises, simultaneously, its whole operation band, without scanning the spectrum, and the frequency detection of unknown signals is instantaneous. The IFMS main component is the discriminator. Every discriminator presents, at its output port, a frequency periodic signal. This signal must alternate between stopping and passing bands. The discriminators output signals generate a binary code, in which every word is associated to a unique frequency sub-band. In this dissertation, in order to project the discriminators, it is proposed a method using stop-bands filters. The filter projects use half-wavelength resonators coupled to a main transmission line. Some types of resonators are analyzed, and the rectangular open-loop resonator is chosen. It’s shown that this resonator, when coupled to a main transmission line, can be modeled by a Butterworth stop-band filter. In addition, it’s developed a technique to increase the stopping bandwidth. Therefore, one can project the filters that present stopping bandwidth from 125MHz to 1,0GHz. Five stop-bands filters are projected in order to function as discriminators of a 5-bits IFMS. This IFMS operates from 1,9375GHz to 3,9375GHz, and its resolution is 62,5MHz. Finally, a comparison between experimental and simulated results is presented.