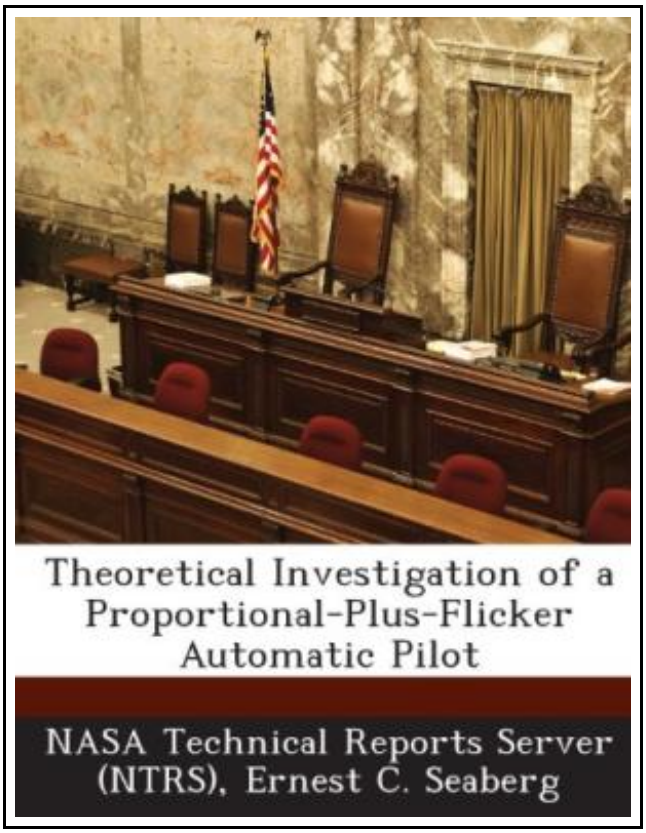
Theoretical Investigation of a Proportional-Plus-Flicker Automatic Pilot



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THEORETICAL INVESTIGATION OF A PROPORTIONAL-PLUS-FLICKER AUTOMATIC PILOT

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BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 58 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.The proportional-plus-flicker automatic pilot operates by a nonlinear principle whereby a fast-acting flicker servomotor response is combined with a low-speed proportional servomotor response for the purpose of obtaining supersonic stability and control. Essentially, the autopilot maintains a zero reference about which the output is proportional to the input. However, a flicker response overrides this proportional response at a fixed angle of gimbal displacement on either side of the zero gyroscope reference. Therefore, in contrast to other high speed control systems, the design requirements are simplified because the two components of the proportional-flicker control system are easy to build separately and they can be combined in a relatively simple manner. By application of the proportional-flicker principle, satisfactory stability can be obtained by the proper adjustment of the variable factors in the autopilot mechanism; namely, the proportional gain, the amplitude of flicker control deflection, the autopilot time-lag factor (the time-lag between flicker and proportional operation), and the point in the range that the autopilot switches from a flicker to a proportional system. There is a possibility that these factors can be adjusted so that a more rapid response time (the time to reach steady state) is obtained with the non-linear proportional-flicker autopilot than with a purely linear proportional autopilot. For the main part of this analysis, the proportional part of the system is approximated by a zero-phase-lag proportional autopilot with the assumption that the control surface moves instantaneously at the point where the system switches from flicker to proportional. Good correlation is shown between the results obtained by this method and results obtained by using a close approximation of an actual autopilot transfer function for proportional autopilot operation. This item ships from La...

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