



Road vehicles — Transient open-loop response test method with pseudo-random steering input

Véhicules routiers — Méthode d'essai en régime transitoire et sur boucle ouverte avec signal d'entrée pseudo-aléatoire

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The reasons which led to the decision to publish this document in the form of a technical report type 2 are explained in the Introduction.

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0 Introduction

0.1 Reasons for a Technical Report

This test method is one of several open-loop transient response test methods adopted by ISO/TC 22. Originally the intention was to publish each of these as separate International Standards. It was then decided to combine them in a single International Standard, ISO 7401, and restrict each procedure to its most basic content. It was, however, also agreed that some of the procedures in their original form contained technical information and additional interesting forms of data presentation that it was desirable to have available. Thus it was decided to have some of the test methods published also as Technical Reports to be used as supplements to ISO 7401.

This document is one of these Technical Reports and it presents an extension of, and gives further explanation to, the transient response test method with pseudo-random steering input. The main additions made in this Technical Report, by comparison with ISO 7401, are amplification of the sections describing data analysis and interpretation. The test conditions are identical to those described in ISO 7401.

The transient open-loop response test methods described in ISO 7401 are based on five different steering-wheel inputs, i.e. step/ramp, one period sinusoidal, pseudo-random, pulse and continuous sinusoidal. The pseudo-random input method applies where vehicle behaviour is assumed to be linear. It enables a vehicle's response to be calculated to any defined input within the range of lateral accelerations used in the tests, including those of the procedures mentioned above. Therefore, it is recommended that this method be selected when the maximum amount of information is required over a limited range of lateral accelerations, as for example during normal public road driving. Other procedures may be more suitable where specific inputs are of interest or where the range of lateral accelerations of interest is large.

0.2 General

See ISO 7401.

0.3 Object of test

The primary object of the test is to determine the frequency response characteristics of a vehicle subjected to a pseudo-random steering input over a frequency range from the lowest possible (limited by vehicle speed and test track width) to the highest achievable. The range normally achievable in practice lies between approximately 0,1 and 4,5 Hz.

Important criteria are

- the variation with frequency of the gain with respect to steering-wheel input of the lateral acceleration and yaw rate responses;
- the variation with frequency of the phase angle with respect to steering-wheel input of the lateral acceleration and yaw rate responses.