

Universal Decimal Classification —

English full edition —
Fourth international edition —
FID publication no. 179 —

**UDC 681.5 Automatic control
engineering**

UDC 025.45:681.5

Cooperating organizations

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This British Standard, having been prepared under the direction of the Documentation Standards Committee, was published under the authority of the Executive Board on November 1976

BSI 01-2000

The following BSI reference relates to the work on this standard:
Committee reference DOS/3

ISBN 0 580 09289 5

Amendments issued since publication

Amd. No.	Date of issue	Comments
3002	May 1979	
4115	November 1982	Indicated by a sideline in the margin

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Foreword

The English version of the Universal Decimal Classification (UDC) is being prepared and published as BS 1000 by the British Standards Institution (BSI) at the original joint request of the British Society for International Bibliography (BSIB) and the Association of Special Libraries and Information Bureaux (ASLIB), now amalgamated as Aslib. It has the approval of the Lake Placid Education Foundation, New York, proprietors of the Dewey Decimal Classification, from which the UDC derives. The first English Full Edition is the 4th International edition authorized by the International Federation for Documentation (FID), The Hague, Netherlands.

This section is part of the English Full Edition. It should be used in conjunction with the Abridged English Edition, BS 1000A, which refers to many other subjects of interest not listed in this schedule, and provides a conspectus of the whole scheme, together with an introduction to its use. For further practical information about the principles, application and utilization of the scheme, users should refer to BS 1000C.

This edition of UDC 681.5 includes modifications authorized in “Extensions and Corrections to the UDC” up to and including Series 11, No. 2, dated April 1982. Subsequent issues of “Extensions and Corrections to the UDC” should be consulted to keep the schedule up to date. Further information about this and other UDC publications is given on page 14. British Standards related to this part of BS 1000 are listed on the inside back cover.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Scope

Under 681.5 is classed information about the principles and theory of automatic control engineering and the techniques and equipment used in automatic control systems.

Related subjects

- 007 Activity and organizing. Information. Communications and control theory generally (cybernetics), including "human engineering"
- 51 Mathematics
- 53 Physics
- 62-5 Operation of machines. Regulation and control
- 62-8 Characterization of machines according to the type of drive
- 621.039 Applied nuclear science. Atomic energy and atomic industry. Nuclear engineering in general
- 621.22 Hydraulic energy. Water power. Hydraulic machinery
- 621.3 Electrical engineering
- 621.5 Pneumatic energy, machinery and tools. Refrigeration and liquefaction techniques and plant
- 621.6 Fluids handling, storage and distribution plant and equipment
- 621.7 Plastic or chipless working, forming and treatment of materials in general
- 621.8 Mechanical power transmission. Machine elements. Gearing. Materials handling. Mechanical attachments, fixings, fasteners. Lubrication
- 621.9 Working, machining with chip formation. Cutting, grinding, sheet working etc
- 65.011.56 Automation — Management and organization
- 658.5 Organization of production. Production planning, management and control. Design
- 681.2 Instrument making. Instrumentation. Measuring instruments and their manufacture
- 681.3 Data processing machines and equipment. Automatic data processing. Computers, calculators etc

Auxiliary signs and subdivisions

Full information about the common and special auxiliary signs and subdivisions (often abbreviated to "common and special auxiliaries") will be found in BS 1000A, BS 1000C and BS 1000: *Auxiliaries*.

Colon sign of relation. For the classification of information for the public, as in abstracts and bibliographies, maximum use of colon combinations rather than of common or special auxiliaries is recommended. The use of the colon sign of relation is preferable for multiple entry systems, as it will help prevent the concealment of information. This usually results in longer notation, however, and for information for more restricted use, the application of auxiliaries may be simpler and more convenient provided that there is an adequate alphabetical subject index.

Common auxiliaries. The common auxiliaries of language = ..., form (0...), place (1/9), race and nationality (= ...), time "...", point of view. 00 ..., materials – 03 ... and persons – 05 ... are applicable throughout the UDC. However, they should be used mainly to express concepts not otherwise provided for in the schedules.

Special auxiliaries. Special auxiliary subdivisions are provided under 681.5. They may be detached and applied to any subdivision of 681.5, e.g.

- 681.5.072 Sensitivity
- 681.523.4 Hydraulic automatic control systems
- 681.523.4.072 Sensitivity of hydraulic automatic control systems

The apostrophe is used to combine the subdivisions of 681.51/.54 to denote systems with more than one characteristic, and an additional series of apostrophe special auxiliaries is given under 681.58.

Typographic presentation

The arrow → means either "see" or "see also" according to the context. The symbol ≅ "subdivide as" means that the number preceding it may be subdivided in the same way as, and with meanings analogous to the subdivisions of, the number which follows it.

SCHEDULE

681.5 Automatic control engineering: control systems, techniques and equipment. cybernetic and automation technology**Special auxiliary subdivisions**

681.5.01	PRINCIPLES AND THEORY OF CONTROL ENGINEERING	681.5.034.4	Gain-phase response
.011	Basic theory of control engineering	.7	Logarithmic frequency response
.012	Analysis	.035	Standard dynamic circuits
.013	Synthesis	.037	Stability
.015	Identification, modelling, parameters etc	.2	Criteria of stability
.2	Parameters in ordinary differential equations	.22	Frequency criteria (Nyquist, Michailov)
.22	Differential approximation	.24	Algebraic criteria (Routh, Hurwitz)
.23	Parameter optimization	.26	Liapunov criterion (direct method)
.24	Methods based on optimal control	.4	Stability margin
.26	Model reference	.5	Degree of stability
.27	Step response	.6	Absolute stability
.28	Repeated integration	.7	Energetic stability
.3	Parameters in an analytical state	.8	Stability of processes
.32	Search technique	681.5.04	DIAGRAMS
.33	Prony's method	.042	Structural diagrams
.4	Parameters in a discrete mode	.043	Functional diagrams
.42	Statistical estimation	.044	Block diagrams
.44	Kalman filtering	.045	Circuit diagrams
.5	Coefficients in a functional series expansion	681.5.07	SENSITIVITY. PRECISION. CONTROLLABILITY
.52	Volterra expansion	.072	Sensitivity
.54	Wiener theory	.073	Precision
.7	Impulse response	.075	Observability. Controllability
	→681.5.033 Dynamic performance of control systems. Impulse transfer characteristics	681.5.08	MEASUREMENT: INSTRUMENTS, RECORDING ETC
.72	Direct impulse testing	681.5.08	681.5.08 $\cong$ 53.08
.73	Deconvolution		→681.518 Information systems (in automatic control)
.75	Correlation techniques	681.5.09	CONTROL SYSTEM FAULTS AND FAILURES. CORRECTION METHODS
.77	Method of moments		
.8	Frequency response		
	<i>For frequency response in systems performance</i> →681.5.034	681.51	Principal divisions
.83	Pulse testing		AUTOMATIC CONTROL SYSTEMS IN GENERAL: TECHNICAL CYBERNETIC FEATURES
.85	Frequency responses from transient response		<i>For systems according to the controlling principle</i> →681.52
.87	Frequency response from spectral analysis		<i>For systems according to the variables controlled</i> →681.53/.54
.017	Simulation (control system)		<i>For control system components</i> →681.58
681.5.03	SYSTEMS PERFORMANCE		<i>The subdivisions of 681.51/.54 may be combined using the apostrophe to denote systems with more than one characteristic, e.g.</i>
.032	Static performance of control systems		681.536.5'272 Temperature control systems (electromechanical)
.033	Dynamic performance of control systems, Impulse transfer characteristics		<i>If the characteristics are considered coordinate, more than one entry may be made, e.g.</i>
.2	Transients and their quality		681.513.6'114 Adaptive system, non-linear
.22	Frequency measures of quality		681.511.4'136 Non-linear system, adaptive
.23	Integral measures of quality		
.25	Root locus measures of quality		
.26	Root loci		
.3	Steady state		
.5	Transfer characteristics		
.034	Frequency response		
	<i>For principles and theory of frequency response</i> →681.5.015.8		
.2	Gain-frequency response		
.3	Phase-frequency response		