Departamento de Eletrônica e Sistemas
Lista 1 de Exercícios de Servomecanismo (ES256)
Data de Entrega: 26/02/2019

Nome do Aluno:_____

Curso:_____

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Recife, 26/02/2019

As listas de exercícios terão influência nas notas. Devem se entregues na data marcada. A apresentação conta muito. Não é obrigatório (pode-se escrever à mão), mas os alunos que o desejarem podem redigir as listas em LaTeX, e neste caso deve ser enviado por e-mail o arquivo em extensão tex `<NomeCompletoDoAlunoListaN.tex>`, onde N é o número da lista de exercício, e também os arquivos de figuras captadas em extensão .eps (encapsulated post script).

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1) Descreva detalhadamente, identificando claramente a entrada, a saída, o elo de realimentação, o objetivo, e explique o funcionamento dos seguintes sistemas:

1. O relógio d'água.
2. O regulador de Watt.
3. O controle de cataventos de Meikle.
4. O controle do nível de água numa caixa d'água, feito por uma bóia (mecânica).

Para cada ítem deve ser feito pelo menos um desenho, e também um diagrama de blocos. Devem ser apresentadas referências para cada ítem. Um autor nesse tópico é Otto Mayr. Algumas edições do livro do Dorf contêm referências. A Web está cheia delas. Sintam-se à vontade para elaborar e dissertar sobre o tema.

1 Referências

Otto Mayr, The Origins Of Feedback Control,MIT Press (1970), 158 pages.

1.1 The Origins Of Feedback Control

Otto Mayr
1970

This is the first historical account tracing the development of the technology of feedback control from its earliest applications. The author describes how the notion entered technology and in what forms it flourished. A case study in the intellectual history of technology, the book spans the invention of feedback control devices in all degrees of realization, from the verbally expressed idea to the industrially proved apparatus. It starts out by establishing three criteria for a precise definition of the concept "feedback": (1) the system must carry out commands and maintain the controlled variable equal to the command signal in spite of external disturbances; (2) the system operates as a closed loop with "negative feedback"; (3) the system includes a sensing element and a comparator of which at least one can be distinguished as a physically separate element.

Ancient devices meeting these criteria are discussed in detail: the water clock of Ktesibios, Philon's self-regulating oil lamp, float devices by Heron, Arabic and Far Eastern inventions. These are followed by the first thermostatic ovens and incubators constructed in the seventeenth century. The classical example is the governor of James Watt's steam engine. The evolution of speed regulators is traced through the nineteenth century, and the logical steps toward the developments of automation and cybernetics are discussed briefly.

The author also advances an interesting theory as to why feedback devices began to appear in quantity in the second half of the eighteenth century, and why mainly in Britain. In his view this was not so much a purely technical breakthrough or the result of the new demands created by the Industrial Revolution as it was a fundamental change in man's attitude toward machinery and toward systems in general: the system came to be regarded as autonomous, maintaining equilibrium by mechanisms inherent in itself. In technology, such thinking led to the invention of feedback devices; in economics, to the free enterprise system of Adam Smith; in politics, to the division of powers and the systems of constitutional government.

`<https://www.amazon.com/Otto-Mayr/e/B001HOTBUI/ref=dp_byline_cont_pop_book_1>`

2 Sites

<https://www.electrical4u.com/
control-system-closed-loop-open-loop-control-system/
>
<http://www.ent.mrt.ac.lk/~rohan/teaching/
EN5001/Reading/DORFCH1.pdf>
<https://www.youtube.com/watch?v=
Iz0Q9nTZCw4>
<https://www.youtube.com/watch?v=
MWJHcI7UcuE>
<https://www.youtube.com/watch?v=
5qJY-ZaKSic>
<https://www.youtube.com/watch?v=
a4c7AwHFkT8>
<https://apmonitor.com/do/index.php/Main/
InvertedPendulum>
<https://www.youtube.com/watch?v=
AuAZ5zOP0yQ>

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