

# Семестровая работа №1. Исследование типовых динамических звеньев системы автоматического управления (САУ)

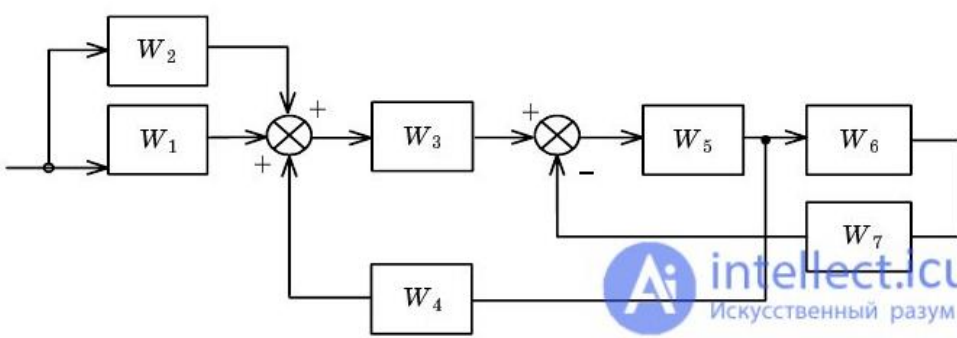
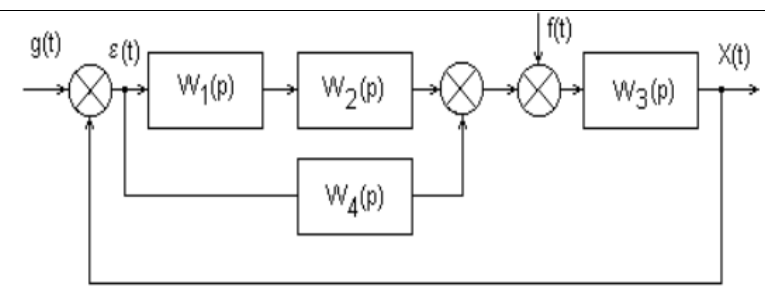
## 1. Исследование темы для самостоятельной работы

Таблица 1. Темы по вариантам

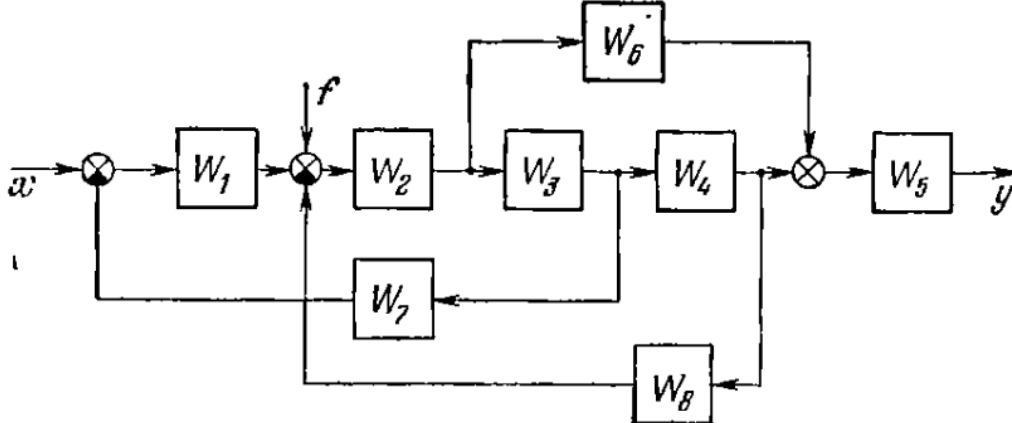
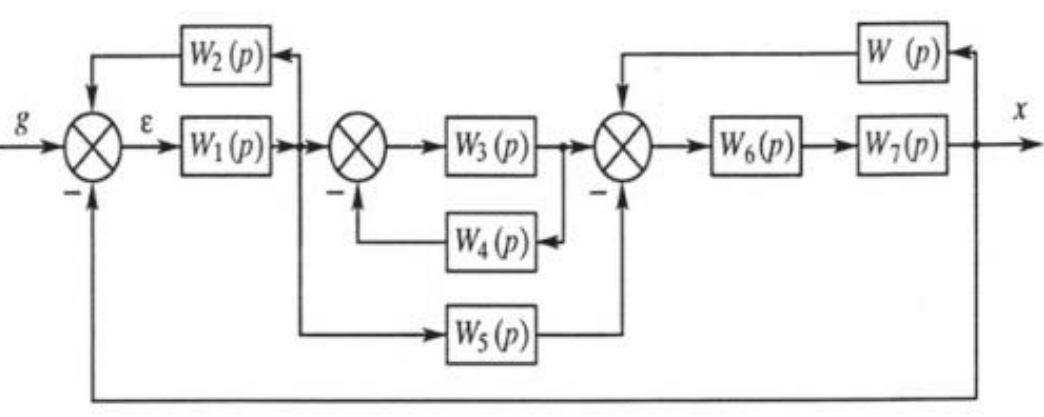
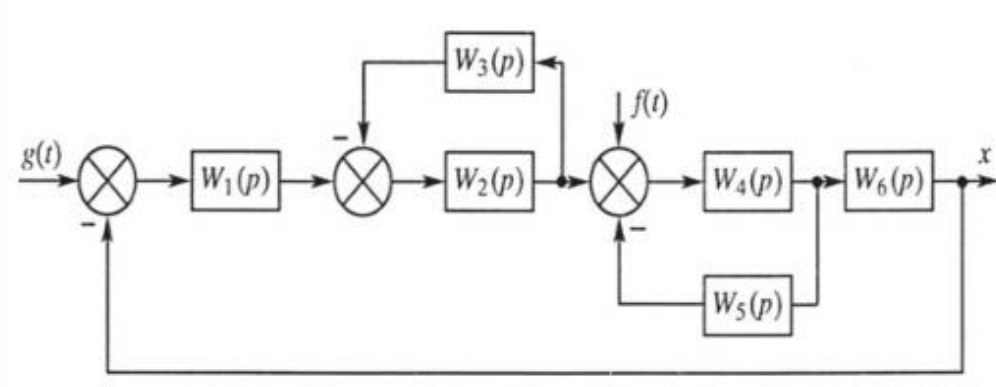
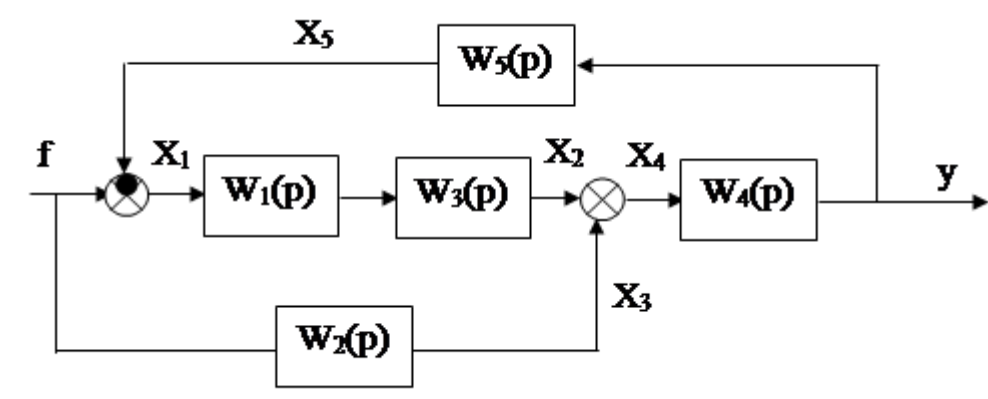
№	Темы
1	Синтез системы автоматического управления.
2	Типовые регуляторы и регулировочные характеристики.
3	Исполнительные устройства
4	Методы и классификация приборов для измерения температуры.
5	Регулирующие органы.
6	Измерительные системы
7	Измерение уровня, плотности и вязкости
8	Классификация приборов для измерения давления. Методы измерения расхода количества вещества.
9	Электроизмерительные приборы. Измерения, погрешности измерения и их классификация
10	Пневматические и гидравлические системы автоматики
11	Структурные схемы систем автоматического регулирования

## 2. Начертить окончательную преобразованную схему и найти передаточную функцию схемы САУ (табл. 2).

Кесте 2. Варианты заданий

№	Начальная схема САУ
1	 <p>The diagram shows a control system with the following structure: A reference input splits into two paths. One path goes through block <math>W_1</math> to a summing junction. The other path goes through block <math>W_2</math> to another summing junction. The output of the first summing junction goes through block <math>W_3</math> to a third summing junction. The output of the second summing junction goes through block <math>W_4</math> to the same third summing junction. The output of the third summing junction goes through block <math>W_5</math> to a fourth summing junction. The output of the fourth summing junction goes through block <math>W_6</math> to a fifth summing junction. The output of the fifth summing junction goes through block <math>W_7</math> to the same fifth summing junction. The output of the fifth summing junction is the system output.</p>
2	 <p>The diagram shows a control system with the following structure: A reference input <math>g(t)</math> goes to a summing junction. The output of this junction is <math>\varepsilon(t)</math>, which goes through block <math>W_1(p)</math> to another summing junction. The output of the second summing junction goes through block <math>W_2(p)</math> to a third summing junction. The output of the third summing junction goes through block <math>W_3(p)</math> to the system output <math>X(t)</math>. The output <math>X(t)</math> is also fed back through block <math>W_4(p)</math> to the first summing junction. A disturbance input <math>f(t)</math> goes to a fourth summing junction, which also receives input from the output of the third summing junction. The output of the fourth summing junction is the system output <math>X(t)</math>.</p>

3	
4	
5	
6	
7	

8	 <p>Block diagram of a control system. Input <math>x</math> enters a summing junction. The output of this junction goes through block <math>W_1</math> to another summing junction. A disturbance <math>f</math> is also input to this second summing junction. The output of the second summing junction goes through block <math>W_2</math> to a third summing junction. The output of the third summing junction goes through block <math>W_3</math> to a fourth summing junction. The output of the fourth summing junction goes through block <math>W_4</math> to a fifth summing junction. The output of the fifth summing junction goes through block <math>W_5</math> to the output <math>y</math>. There are two feedback paths: one from the output <math>y</math> through block <math>W_6</math> to the third summing junction, and another from the output <math>y</math> through block <math>W_7</math> to the first summing junction. There is also a feedforward path from the output of the third summing junction through block <math>W_8</math> to the fifth summing junction.</p>
9	 <p>Block diagram of a control system. Input <math>g</math> enters a summing junction. The output of this junction is <math>\epsilon</math>, which goes through block <math>W_1(p)</math> to another summing junction. A feedback signal from the output <math>x</math> through block <math>W_2(p)</math> is subtracted at this junction. The output of this second summing junction goes through block <math>W_3(p)</math> to a third summing junction. A feedback signal from the output <math>x</math> through block <math>W_4(p)</math> is subtracted at this junction. The output of the third summing junction goes through block <math>W_5(p)</math> to a fourth summing junction. A feedback signal from the output <math>x</math> through block <math>W_6(p)</math> is subtracted at this junction. The output of the fourth summing junction goes through block <math>W_7(p)</math> to the output <math>x</math>.</p>
10	 <p>Block diagram of a control system. Input <math>g(t)</math> enters a summing junction. The output of this junction goes through block <math>W_1(p)</math> to another summing junction. A feedback signal from the output <math>x</math> through block <math>W_2(p)</math> is subtracted at this junction. The output of this second summing junction goes through block <math>W_3(p)</math> to a third summing junction. A disturbance <math>f(t)</math> is also input to this third summing junction. The output of the third summing junction goes through block <math>W_4(p)</math> to a fourth summing junction. A feedback signal from the output <math>x</math> through block <math>W_5(p)</math> is subtracted at this junction. The output of the fourth summing junction goes through block <math>W_6(p)</math> to the output <math>x</math>.</p>
11	 <p>Block diagram of a control system. Input <math>f</math> enters a summing junction. The output of this junction is <math>X_1</math>, which goes through block <math>W_1(p)</math> to block <math>W_3(p)</math>. The output of <math>W_3(p)</math> is <math>X_2</math>, which enters another summing junction. A feedback signal from the output <math>y</math> through block <math>W_4(p)</math> is subtracted at this junction. The output of this second summing junction is <math>X_4</math>, which goes through block <math>W_4(p)</math> to the output <math>y</math>. There are two other feedback paths: one from the output <math>y</math> through block <math>W_5(p)</math> to the first summing junction, and another from the output <math>y</math> through block <math>W_2(p)</math> to the second summing junction. The signal <math>X_3</math> is the output of block <math>W_2(p)</math>.</p>

3. Составить функциональную, принципиальную и структурные схемы, определить передаточную функцию системы. Дать подробное описание функционирования соответствующих систем управления.

Таблица 3

Вариант	Технологический процесс или операция
1	Вождения зерноуборочного комбайна
2	Нагрева воды
3	Регулирования уровня жидкой среды
4	Регулирования температуры жидкой среды
5	Регулирования давления пневмогазовой системы
6	Считывания штучных изделий
7	Управления освещением
8	Измерения плотности веществ
9	Токовой перегрузки
10	Загрузки э/двигателей
11	Регулирование частоты вращения рабочих органов

**Отчет содержит:**

1. Указать: Выполнил: ФИО, ОП, курс
2. Задание 1 – 3 по варианту (дано/берілгені, решение/шешімі, листинг программы (скрин модели), начальная и преобразованная схема САУ
3. Список литературы/Әдебиеттер тізімі.

**Защита отчета (дедлайн 29.10).**

**Защита будет проходить устно в форматах онлайн/офлайн (29.10 с 10:00-13:00). На защите помимо отчета будут контрольные вопросы по пройденным материалам (лекции 1-7).**