

## 4. USE OF LAMBERT W-FUNCTION FOR ANALYSIS AND CONTROL OF TIME-DELAY SYSTEMS

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Konzultant:

### **Anotace:**

As time-delay systems belong to the class of infinite-dimensional systems, they have an infinite number of eigenvalues. Many tasks of system analysis and control design require to calculate or compute loci of the dominant subset of this infinite spectrum. Due to the transcendental nature of the characteristic equation, most researches abandon any attempt to calculate it analytically, and only numerical (approximate) computing methods are usually used.

The Lambert W-function represents a peculiar and unique tool that enables to calculate eigenvalues analytically for some classes of time-delay systems. However, despite its high usability, there is a lack of theoretic as well as practical applications of the W-function in the literature. For instance, it is used only to commensurate delays, or no systematic pole assignment via the function has been presented so far.

The Ph.D. candidate should devise, investigate and solve several open problems from system and control theory how to use the Lambert W-function for time-delay systems. This task, however, requires advanced mathematical knowledge.

### **Literatura:**

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