SEMINAR - סמינר

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב׳ 15.03.21
(ב׳ בניסן תשפ״א), בשעה 14:30 באמצעות הזום: https://technion.zoom.us/j/93460226855

מרצה:

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על הנושא:

Alternative fuels for clean and efficient internal combustion engines

The seminar will be given in English

להלן תקציר ההרצאה:

Internal Combustion (IC) engines have been facing severe criticism for their pollutant and greenhouse gas emissions and overall low thermal efficiency. Although modern, state-of-the-art IC engines are relatively clean and efficient, they face dire competition with the rising trend in electrification and renewable energy technologies. Nevertheless, IC engines can still play a significant role in future energy scenarios. Moreover, IC engines operating with low-carbon fuels (e.g., natural gas, low-octane gasoline) can reliably and affordably promote contributions to global CO2 emission reductions. Clean energy systems with renewable (e.g., biofuels, e-fuels) and/or carbon-free (e.g., hydrogen, ammonia) fuels can pave the way to a future carbon-neutral society.

This presentation will provide an overview of the IC engine solutions for future energy systems. Fuel and engine technology options for different applications (e.g., automotive, marine transportation, power generation) will be discussed. The latest experimental findings and simulation results on gasoline compression ignition technology for light-duty vehicles will be presented along with our recent research activities in hydrogen (H2) as a compression ignition engine fuel. The implementation of hydrogen as the primary fuel in a dual-fuel heavy-duty compression ignition engine was successfully tested at low and medium operating loads. At higher loads, the engine was prone to pre-ignition due to hydrogen's lower ignition energy. We showed that hydrogen can replace carbon-based fuels by up to 98% (energy ratio) under particular operating conditions. Hydrogen-diesel dual-fuel combustion can provide a simultaneous reduction of carbon and nitrogen oxide emissions of over 90%, with concomitant soot emissions reduction by 85% compared to the conventional diesel engine.

The optimal engine operating conditions (e.g., fuel injection strategy, intake air dilution) to expand the dual-fuel (H2-diesel, H2-biodiesel, H2-ammonia) engine load limits and improve the fuel efficiency and emissions, need to be further investigated. A detailed outline of the proposed research activities on hydrogen and hydrogen energy carriers for the next generation of internal combustion engines will be provided.

מארח: פרופ׳ מיכאל שפירא

בברכה,

פרופ״ת אתי סאס
מרכז הסמינרים