



خلاصات اطاريح طلبة الماجستير في قسم هندسة تقنيات ميكانيك القوى للعام الدراسي ٢٠١٧-٢٠١٩

NO.	Names of researcher	Title of Thesis	Abstract
1	Mmohammed Jasim Obaid	NUMERICAL AND EXPERIMENTAL STUDY OF SOLAR WATER IN HEATING A SPACE	<p>In this work, solar water heaters were used to heat the space by passing a hot fluid from the solar collector to a radiator inside the room. This work aims to save electrical energy, and reduce environmental pollution. A numerical and experimental study was conducted to evaluate the thermal performance of the heating system. Experimental tests were conducted to heating a room with a 10 m² area by using flat plate collector (FPC) solar water heater at The Engineering Technical College in the Alternative and Renewable Energy Research unit Najaf / Iraq (31.59° N Lat., 44.19° E Long.) within three months (January, February, March) in 2019. The factors whose impact has been studied are (weather conditions, working fluid type, and economic analysis of the system). The numerical studies were obtained by COMSOL 5.3 multiphysics software to analysis the thermal performance of a flat plate collector, where the effect of (volume flow rate, working fluid type, and weather conditions) were studied. Numerical results showed the optimum volume flow rate was 40 L/hr. Also, the ethylene-glycol-water mixture achieved the highest amount of useful heat and efficiency tha other fluids at the same flow rate. The experimental results showed that the use of engine oil grade (10w-30) as a working fluid gave the highest amount of useful heat and efficiency at the high volume of flow rate compared to other fluids. So the solar heating syste has contributed to save electric power at a rate of 34% of the total energy required for room heating at days test in January. Whereas in February and March were 39.5% and 86% respectively. The economic analysis of the use of heating systems showed that the average cost saved was 38000 IQD/month, while the payback period was 5.2 years. In the present work, the maximum error between theoretical and experimental results does not exceed (8%).</p>
2	Ahmed Razzaq Kareem Salm	EXPERIMENTAL STUDY FOR ENHANCEMENT OF HEAT TRANSFER BY USING AIR BUBBLES INJECTION INSIDE A SHELL AND COILED TUBE HEAT EXCHANGER	<p>Transferring thermal energy efficiently requires a suitable heat exchanging device such as heat exchanger which is capable of extracting maximum thermal potential of energy source at the minimum cost and time. In this regard, traditional surface type heat exchangers have some substantial drawbacks, such as high heat transfer resistance of surface and associated fouling layers and therefore ultimately cost. So, any attempt to enhance heat transfer characteristics of a surface type heat exchanger, leading to enhance its thermal performance. One of the most promising methods for enhancement, which has been proposed recently, is the air bubbles injection technique. Hence, in the present study, the effect of air injection on thermal performance of a vertical counter-flow coiled tube heat exchanger was investigated experimentally with completely different operation parameters compared to the related studies in the literature. The air was injected into the shell side of the heat exchanger as air bubbles with an average diameter of approximately 100 μm via a porous sparger (new injection method). The study conducted to optimising the operational parameters in term of the void fraction (air and water volumetric flow rates) of the shell side under laminar flow ($316 \leq Re \leq 1523$).</p>

3	Jameel Tawfiq Al-Naffakh	EXPERIMENTAL INVESTGATION OF THE EFFECT OF BURNER GEOMETREY ON FLAME STABILITY	<p>combustion and its control are essential to our existence on this planet since we knew it. Nowadays , the largest share of the worlds electricity and most of our transpotation system are powered by combustion. In addition, industeial processes also rely heavily upon combustion. In most industrial combustion system, combustion occurs under turbulent now conditions that can produce combustion instabilities. These are problematical since they can result in oscillations in thrust,low -or high-cycle fatigue of system component, flame blowoff or flashback, and oscillations in combustion efficiency together with high emission levels or even damage to the combustion systems. thus, flams stabilization is of fundamental importance in the design, the efficient performance and the reliable operation of combustion systems.the effect of the burner geometry on operation window of small commercial burner (12-14Kwh) was studied. the burner in origin using diesel as a fuel and modified by the researcher to operate with LPG. The length of the burner rim was studied by taking three values of length (5cm , 10cm and 15cm) which represent a ratio of (1,2 and 3) to burner diameter respectively . The modification shows that the ability to use dual fuel in such small combustion unit is possible with minimum addition cost for control.</p>
4	Hiba Qasim Mohammed	EXPERIMENTAL STUDY OF SOLAR WATER HEATING BY USING AIR BUBBLES INJECTION	<p>Transferring thermal energy efficiently requires a suitable heat exchanging device such as heat exchanger which is capable of extracting maximum thermal potential of energy source at the minimum cost and time. In this regard, traditional surface type heat</p>
5	MUNTADHER MOHAMMED ALI SAEED	NUMERICAL AND EXPERIMENTAL STUDY FOR ENHANCEMENT OF SINGLE-SLOPE SOLAR STILL PRODUCTIVITY USING PCM-NANOPARTICLES	<p>The single slope solar still is simple to install and low cost, it works depending on the free and available solar energy, it has long life, it needs little maintenance and works in almost all regions and conditions. Because of the low productivity of the model, which is considered one of the most important drawbacks, a theoretical study was conducted to improve the productivity of the model using a mass of PCM or NPCM and study the important factors that effect on the productivity .The study was conducted at the Technical College of Najaf, above the surface of the Department of power Mechanics Engineering, Najaf / Iraq (31.59o N Lat., 44.19o E Long.) during the May in 2019 , in terms of the effect of (water masses, change of factors and atmospheric conditions, mass of PCM or NPCM and concentration of nanoparticles). Use the COMSOL program to analyze the data theoretically and get an optimal study to enhanced the productivity, where it was found that increasing the mass of salt water or a mass of the PCM/NPCM above 1kg proportion inversely proportional to productivity and that the increase of air speed, the value of solar radiation and ambient temperature directly proportional to productivity. The maximum productivity was 6 L/m² per day. The process of comparing between the theoretical and practical results showed that the error rate does not exceed 13.6%.</p>