

## *Design, Implementation and Experiments on a Fish-Like Robot*

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### **ABSTRACT**

One of main methods for protecting nature is to use nature as an inspiration source for designing new products for human being's needs. Movement and maneuver in fluids is an important issue in human activity. In this work, by inspiration from knife fish, an undulating fin for producing propulsion force are designed and implemented. This undulating fin is a segmental anal fin, and produce sinusoidal waves which are needed for producing propulsion force. Then, parameters of this sinusoidal wave are discussed.

In the fish robot, with using a special mechanical system, the direction of propulsive force is adjustable for controlling of direction and depth of swimming. Then, details of wireless control system for maneuvering and controlling of robot `s speed are presented. Finally, the results of fish robot `s movement is discussed experimentally.

**KEYWORDS :** Biomimetic, Fish robot, Undulating fin, Controlling of direction and depth, Wireless control system, velocity Diagrams

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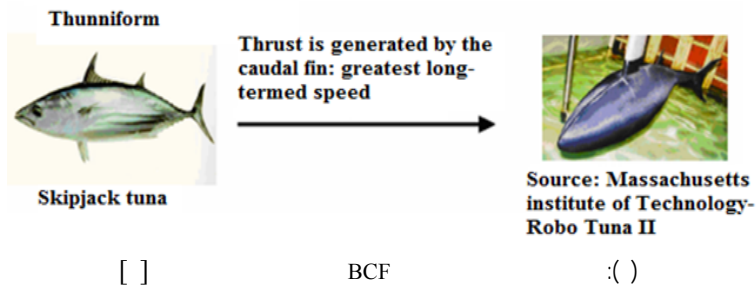
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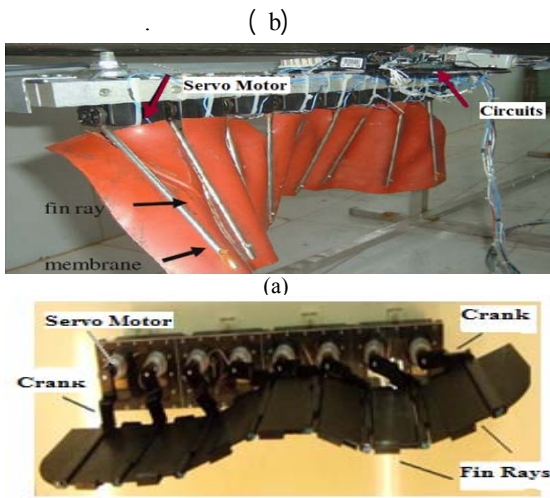
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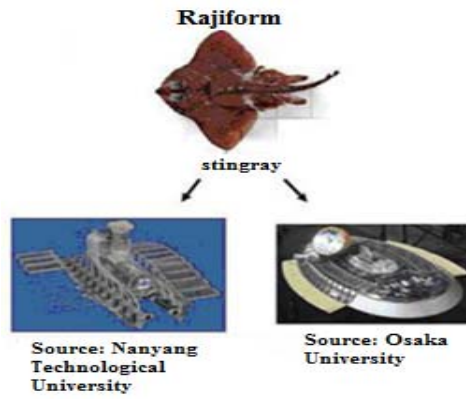
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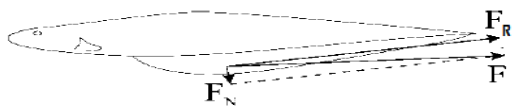
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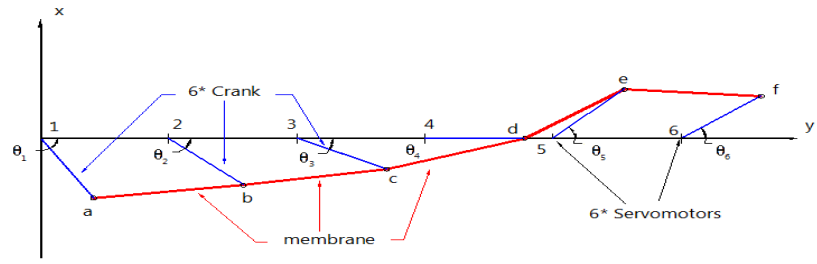


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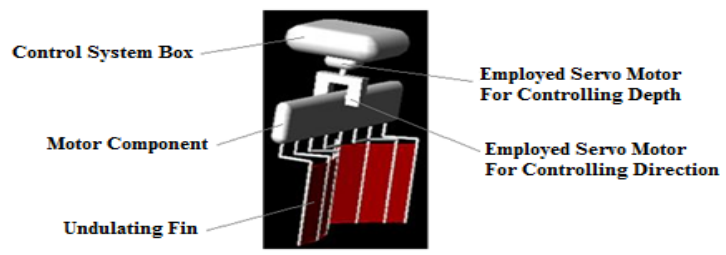
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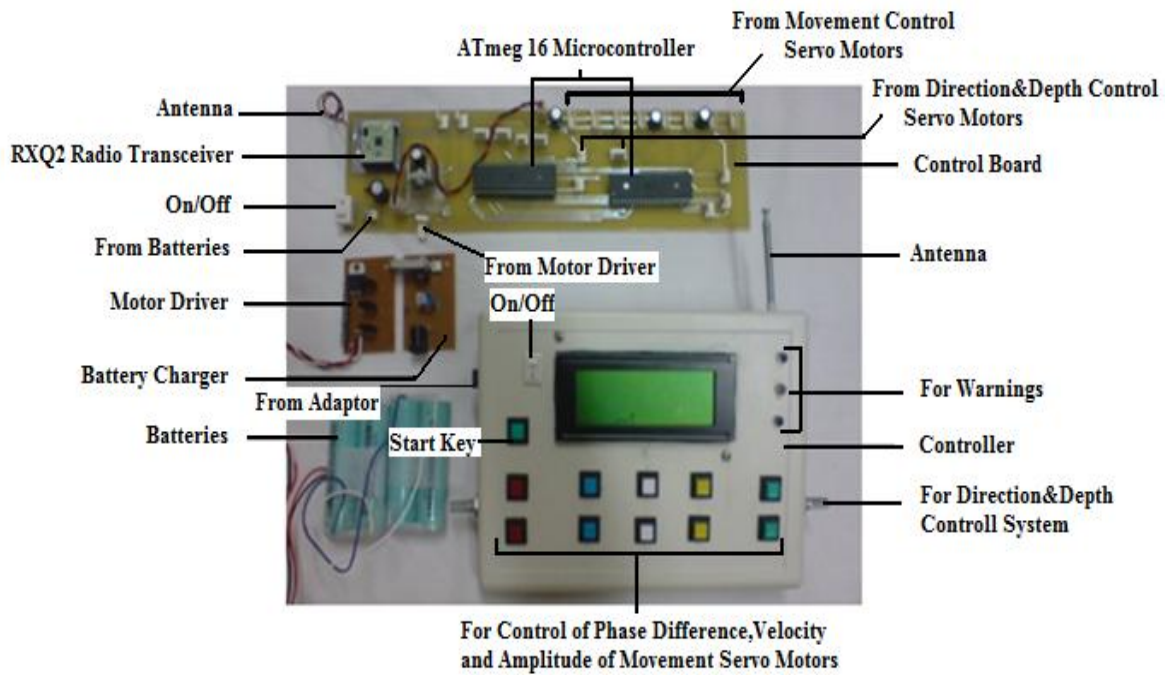
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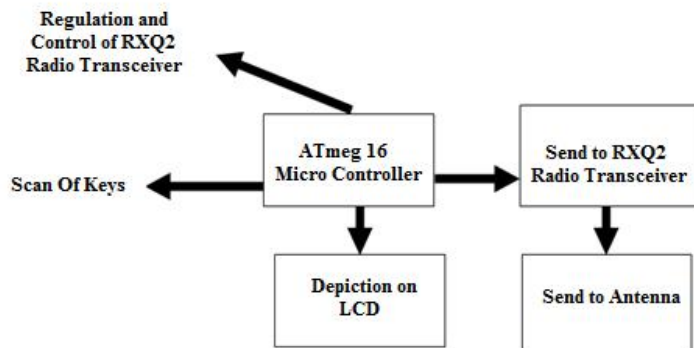
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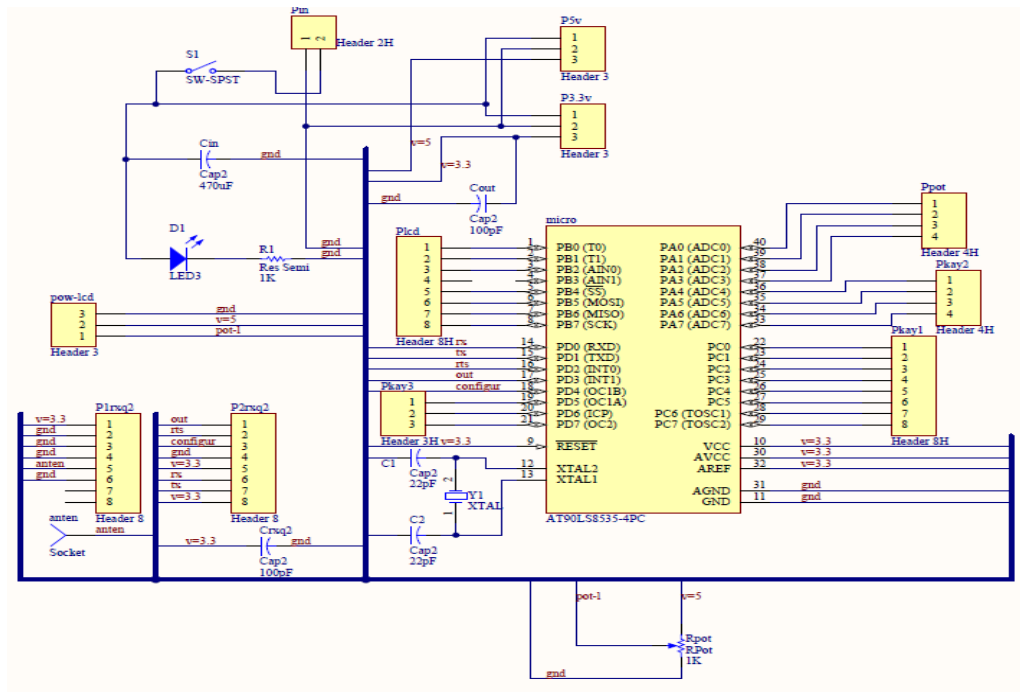


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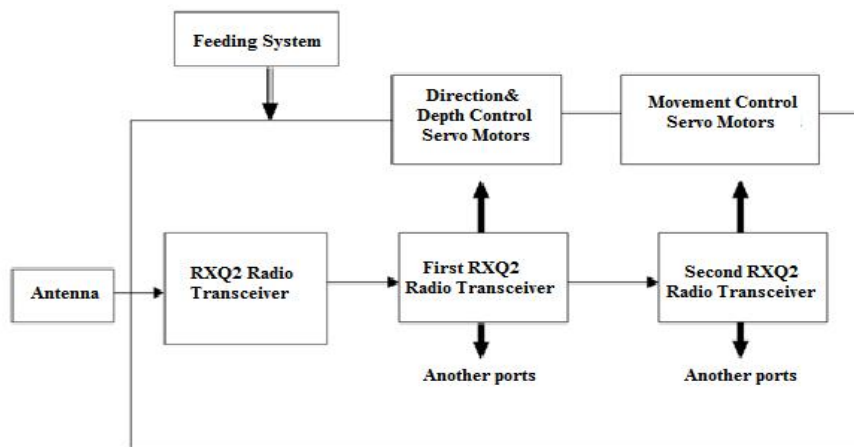


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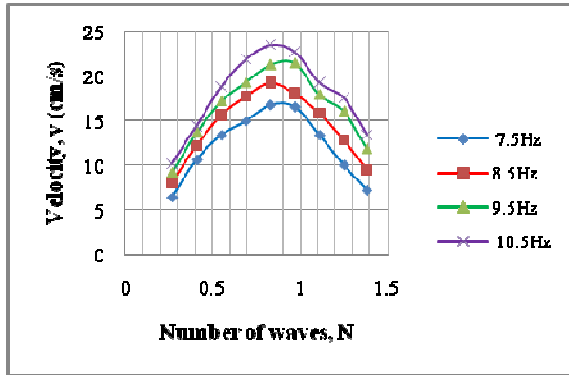
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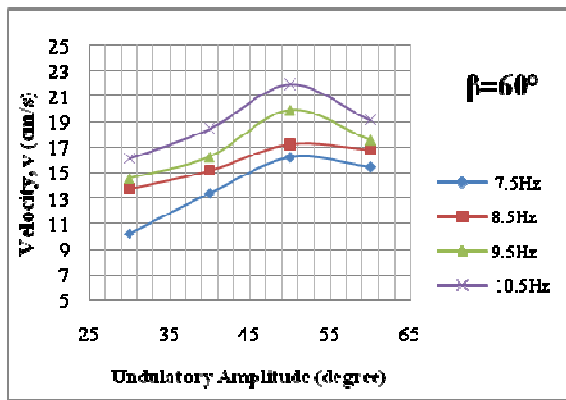


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$$N = \frac{\beta \cdot n_f}{360} \quad n_f = N - 1 \quad (1)$$

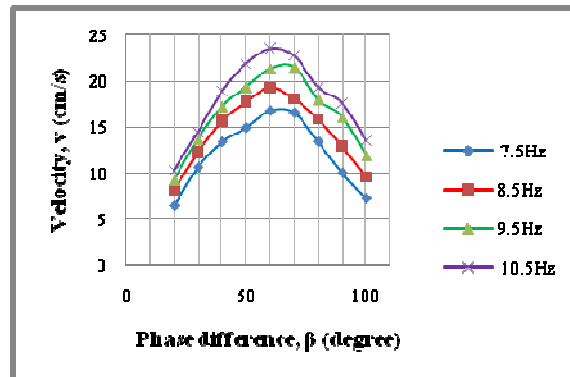
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- <sup>1</sup> Knifefish
  - <sup>2</sup> Modular
  - <sup>3</sup> Servomotor
  - <sup>4</sup> Wireless
  - <sup>5</sup> Drag force
  - <sup>6</sup> Hu, T.
  - <sup>7</sup> Zhang, D.
  - <sup>8</sup> Fin rays
  - <sup>9</sup> Low, K.H.
  - <sup>10</sup> Willy, A.
  - <sup>11</sup> Crank
  - <sup>12</sup> University of defense technology, Changsha
  - <sup>13</sup> Nanyang technological university, Singapore
  - <sup>14</sup> Slider
  - <sup>15</sup> Anal fin
  - <sup>16</sup> Pectoral fin
  - <sup>17</sup> Microcontroller
  - <sup>18</sup> Radio transceiver
  - <sup>19</sup> Genetic algorithm