

Discrete Mathematics

Problem Set 5

2. Show that $f_1 + f_3 + f_5 + \dots + f_{2n-1} = f_{2n}$ for $n \geq 1$

• **Base case:** $n = 1$

– $f_1 = f_{2*1}$

– $1 = 1$

• **Inductive hypothesis:** Assume

– $f_1 + f_3 + f_5 + \dots + f_{2k-1} = f_{2k}$

• **Inductive step:** Prove

– $f_1 + f_3 + f_5 + \dots + f_{2k-1} + f_{2(k+1)-1} = f_{2(k+1)}$

– $f_1 + f_3 + f_5 + \dots + f_{2k-1} + f_{2k+1} = f_{2k+2}$

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- **Inductive hypothesis:** Assume

$$- f_1 + f_3 + f_5 + \dots + f_{2k-1} = f_{2k}$$

- **Inductive step:** Prove

$$- f_1 + f_3 + f_5 + \dots + f_{2k-1} + f_{2k+1} = f_{2k+2}$$


$$- f_{2k} + f_{2k+1} = f_{2k+2}$$

- True by definition of f_{2k+2}